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ARMS CONTROL AND THE MILITARIZATION OF SPACE

HEARING

BEFORE THE

SUBCOMMITTEE ON ARMS CONTROL, OCEANS, INTERNATIONAL OPERATIONS AND ENVIRONMENT

OF THE

COMMITTEE ON FOREIGN RELATIONS UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

SECOND SESSION

ON

S. RES. 129

EXPRESSING THE SENSE OF THE SENATE WITH RESPECT TO RESUMPTION OF NEGOTIATIONS BETWEEN THE UNITED STATES AND THE UNION OF SOVIET SOCIALIST REPUBLICS ON THE LIMITATION OF ANTISATELLITE (ASAT) WEAPONS SYSTEMS

SEPTEMBER 20, 1982

Printed for the use of the Committee on Foreign Relations

U.S. GOVERNMENT PRINTING OFFICE
99-711 O WASHINGTON: 1982

538151

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ARMS CONTROL AND THE MILITARIZATION OF SPACE

MONDAY, SEPTEMBER 20, 1982

UNITED STATES SENATE,
SUBCOMMITTEE ON ARMS CONTROL, OCEANS,
INTERNATIONAL OPERATIONS AND ENVIRONMENT OF THE
COMMITTEE ON FOREIGN RELATIONS,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:37 a.m., in room 4221, Dirksen Senate Office Building, Hon. Larry Pressler (chairman of the subcommittee) presiding.

Present: Senators Pressler and Percy.

Senator PRESSLER. I will call this meeting to order of the Subcommittee on Arms Control, Oceans, International Operations and Environment.

We are honored this morning to hear testimony from Eugene Rostow and from Richard DeLauer, but first I have a brief opening statement to set the context of this hearing.

In May of last year, I offered a resolution in the Senate calling for a return to the United States-Soviet Antisatellite [ASAT] Weapons Talks, which were scuttled in the wake of the Soviet invasion of Afghanistan. My interest in this area since then has continued to grow, and this committee has adopted my amendment to the Arms Control and Disarmament negotiations for 1982 and 1983 directing the agency to conduct a major research effort on so-called killer satellites.

I ask that my resolution, S. Res. 129, be printed in the record of this hearing along with an article I wrote for the Christian Science Monitor of September 15, 1982.

[The material referred to follows:]

97TH CONGRESS
1ST SESSION

S. RES. 129

Expressing the sense of the Senate with respect to resumption of negotiations between the United States and the Union of Soviet Socialist Republics on the limitation of antisatellite (ASAT) weapons systems.

IN THE SENATE OF THE UNITED STATES

MAY 6 (legislative day, APRIL 27), 1981

Mr. PRESSLER submitted the following resolution; which was referred to the Committee on Foreign Relations

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RESOLUTION

Expressing the sense of the Senate with respect to resumption of negotiations between the United States and the Union of Soviet Socialist Republics on the limitation of antisatellite (ASAT) weapons systems.

Whereas the United States and the Union of Soviet Socialist Republics are parties to the Treaty on the Limitation of Anti-Ballistic Missile Systems, done at Moscow on May 26, 1972;

Whereas article XII of the treaty prohibits each party to the treaty from interfering with the other party's national technical means of verification;

Whereas the United States and the Union of Soviet Socialist Republics increasingly depend on satellites for verification of arms control agreements, strategic warning, communications, meteorology, navigation, scientific exploration, and other missions;

Whereas the development of antisatellite (ASAT) weapons would call into question the ability of satellites to perform these functions, threaten our freedom to operate in space, and raise the specter of a costly and destabilizing arms race in space; and

Whereas in the absence of an ASAT agreement, both parties may soon complete development of new and more sophisticated ASAT weapons: Now, therefore, be it

Resolved, That it is the sense of the Senate that the President should promptly resume negotiations with the Government of the Union of Soviet Socialist Republics on a balanced and verifiable agreement limiting the development, deployment, or use of weapons systems designed exclusively to intercept, damage, or destroy orbiting satellites.

SEC. 2. The objective of such negotiations should be to promulgate an agreement providing for—

(1) a comprehensive nonuse ban;

(2) a moratorium on further testing in space of any weapons systems designed exclusively to intercept, damage, or destroy orbiting satellites;

(3) dismantling and destruction of all such currently operational ASAT interceptors; and

(4) stringent verification of each party's compliance with the above provisions.

SEC. 3. It is further the sense of the Senate that in pursuing agreement with the Union of Soviet Socialist Republics on ASAT limitations, the President should agree to no provision that would in any manner restrict the development and operation of the Space Shuttle or impede legitimate research and development (R&D) activities permitted under the SALT I ABM Treaty.

[From the Christian Science Monitor, Sept. 15, 1982]

OPINION AND COMMENTARY

STOP A RACE IN SPACE ARMS—BEFORE IT GETS OFF THE GROUND

(By Larry Pressler)

Last year I offered a Senate resolution urging the resumption of arms control talks on antisatellite (ASAT) weapons. Since then, there has been little movement toward the negotiating table and a great deal of activity indicating that the United States and the Soviet Union are on the verge of a military space race. This is a troubling development, one that requires greater attention to arms control than has so far been the case.

The U.S.-Soviet competition is no longer just in so-called killer satellites, though their development continues apace. A myriad of exotic and deadly concepts are rapidly moving from the drawing board to the test range. The picture of outer space toward the year 2000 is of satellites attacking satellites, and beams from space neutralizing missiles on the ground.

In the contest for this high ground, the U.S. has recently made a number of dramatic decisions. The Air Force's Space Division has been rechristened as a separate Space Command. Next fiscal year the military space budget climbs from its current level of $2.9 billion to $4 billion. As a consequence, defense programs in space will for the first time hold a higher budgetary priority than its peaceful exploration.

As for exotics, the Pentagon spends $300 million a year on laser weapons and one has been test-fired from an aircraft. Press reports indicate that the U.S. soon will be testing an F–15 launched ASAT which some analysts claim has the potential to sweep the skies of 100 to 200 Soviet satellites in a day. This system will be operational in the second half of this decade.

The Soviets have not been innocent bystanders in all this. Since the early 1970s, they have possessed an operational space weapon which joins the SS–9 missile to an ASAT interceptor. The Soviets have worked intensively to perfect this weapon. On June 19 a test of this ASAT was one element in a coordinated series of weapons launches, involving land- and sea-based strategic missiles, a MIRVed SS–20 theater weapon, and experiments involving ballistic missile defenses. To some observers, this test sequence suggests that the Soviets view offensive space weapons as part of a scenario for waging nuclear war. Additionally, Moscow has an active beam-weapon development program that is said to be five years ahead of our own.

It was in response to the Soviet ASAT deployment that the U.S. decided in 1978 to develop a counter. The result was the F–15/ASAT combination. At the time, the response was designed, in part, as a bargaining chip that would draw the Soviets to the negotiating table. Between 1978 and 1979 three rounds of talks were held. Plans for a fourth fell victim to the invasion of Afghanistan. Agreement also fell victim to Soviet intransigence. The Soviets had two objectives in the talks: to scuttle the U.S. shuttle while leaving their ASAT alone.

Washington's interest in space talks was cooled by the Soviet attitude, but the success of American space efforts has put space arms control into deep freeze. It is becoming increasingly evident that the U.S. ASAT represents a technological leap ahead of the crude and inflexible Soviet system. Planners now see the program as a way of cutting the Kremlin off at the pass in space.

Such a space policy is shortsighted. Space technology knows no bounds—any American advantage may prove momentary. The cost of a space race will be enormous, judging from the billions already committed before it gets off the ground.

The U.S. is far more dependent upon satellites; we, more than the Soviets, require stability in space. For the same reason, the costs and risks of such a contest would be higher for us. It could also detract from our ability to meet the requirements of traditional defense activities on earth.

Today we rely heavily on satellites for commercial and military communications. By tracking military developments, military satellites have made negotiations possible; without satellites, treaty verification would be a serious problem. Satellites are vital for guarding against strategic attack in time of peace and for the command, control, and targeting of U.S. missiles in time of

war. A space race will increase the cost of conducting these important activities. For instance, hardening satellites and adding antijamming equipment to deal with space threats will make it more expensive to build and to launch satellites.

I am not opposed to the deployment of space weapons if such action is necessary. But for me, necessity is a product of a lack of alternatives rather than of technological opportunity or of temporary advantage. In the absence of a serious arms control effort, I remain unconvinced that a military competition is unavoidable.

Today's situation is very different from that which predominated during the last set of negotiations. The U.S. ASAT and related military space activities have the Soviets worried. Some analysts claim that Moscow may wish to halt the competition which they started now that they realize they are not in a position to dominate. Clearly, issues such as verification may daunt even the best of intentions, but assessing these issues as well as judging the Soviet attitude toward arms control requires a return to the negotiating table.

Larry Pressler, Republican Senator from South Dakota, is chairman of the Senate Foreign Relations Committee's Arms Control Subcommittee.

Senator PRESSLER. As I wrote in the Monitor, there has been little movement toward negotiations since my resolution was introduced, and a great deal of activity indicating we are on the verge of a United States-Soviet space weapons race. This race is not confined to killer satellites alone. Both countries are now developing a number of exotic space-based and space-related weapons.

I favor the peaceful exploration of space. Programs such as the Space Shuttle are a valuable national asset which help to improve life on earth. Military satellites in use today make verification of arms control agreements possible, provide for rapid communication with U.S. forces worldwide, assure early warning of strategic attack and other critical missions. These missions are vital for keeping the peace.

In my view, a space weapons race could undermine our ability to conduct these important activities. Judging from the sums diverted to military space race activities before this race is seriously off the ground, such competition could be an enormous drain on our taxpayers. It could also weaken our ability to make good on current deficiencies in space exploration and in our earth-based military forces.

Thus, before we decide to move into the development of new space weapons for war, I think it vital that we examine the viability of arms control alternatives. I hope that this hearing will mark the start of this process.

Let me say that I think that we are on the verge of a major round of new expenditures for space weapons and the arms race is extending to outer space. There are proposals to place antimissile capabilities and other platforms in space. There are proposals to build new and more sophisticated satellite killers. The Russians are already very active in this area.

However, the weaponization of space is one area that apparently only two countries are heavily involved in, that is, the Soviet Union and the United States. But the expense of the space arms race will be much greater than the earth arms race, and taxpayers and humanity will have to give up resources otherwise allocated to human needs. I wish we could find a way to stop it before it gets much further along.

Today we will receive testimony first from Eugene Rostow, director

of the Arms Control and Disarmament Agency [ACDA], and from Dr. Richard D. DeLauer, Under Secretary of Defense for Research and Engineering. We will also hear public witnesses later, but first I would like to call on Dr. Rostow, and thank him very much for being here this morning.

STATEMENT OF HON. EUGENE ROSTOW, DIRECTOR, ARMS CONTROL AND DISARMAMENT AGENCY

Mr. ROSTOW. Good morning, Mr. Chairman. It is always a pleasure to be here, and a privilege.

I have a prepared statement, and since it does respond to your opening statement, I think I shall read it.

During the first months of the administration and for some time thereafter, the position of the United States on many arms control issues was that we were reviewing the problems and would come up with a position in due course.

Naturally, this posture—wise and inevitable as it was—embarrassed our negotiators, who were forced to suffer the slings and arrows reserved for immobile targets at international meetings, in congressional hearings and in the media. On many occasions before this and other committees of the Congress during the last year or so, I vowed to press for a decision on a number of outstanding arms control issues.

This has been done. President Reagan has made a series of forward-looking and realistic policy decisions on the nuclear arms negotiations; on the mutual and balanced force reduction [MBFR] talks in Vienna; on nonproliferation policy; on chemical and biological warfare; and on a number of other topics. As a result, the United States is conducting a vigorous and dynamic arms control diplomacy, firmly rooted in the principles of our national security, and seeking to achieve genuine progress toward the goal of peace.

In the field of arms control possibilities for outer space, nevertheless, beyond those already achieved through the Limited Test Ban and Outer Space Treaties, our policy must remain that we will continue to study space arms control options, as President Reagan recently announced. This is not a passive policy nor an evasion in any way. On the contrary, it is the only responsible course the Government of the United States could take at this moment, given the difficult nature of negotiations on this subject, the extent of the Soviet space threat, and the possibilities of change in the areas of science and technology which dominate the future of space.

I can sum up what I have to tell you today in two anecdotes which do respond to the conclusion of your opening statement and your excellent article in the Christian Science Monitor. We do not disagree with that article in its evaluation of the evidence, although we do somewhat disagree with the inference you draw as to the next steps.

During the late sixties, when I was, among other things, the State Department's senior officer for economic policy, Secretary of the Treasury Fowler and I were in Paris, calling on M. Michel Debre, the French Minister of Finance, a colleague we appreciated and enjoyed. Discussing the military balance and its implications, our French friend said, "What the world needs most is a trade union of Finance

Ministers to suppress the scientists." Alas, there is no way in which his utopian goal can be achieved. And I must add that in the field of space technology many of the potentialities for the future are hopeful rather than sinister, on the side of defense and deterrence rather than of terror.

The second anecdote which brings out the nature of our problem in defining a reasonable arms control policy for space is a comment the British Foreign Minister of the day, Lord Carrington, made to me and Ambassador Nitze last fall at the end of a long conversation in London about our INF problems. "Don't let anybody rush you," Lord Carrington said. "For this job, good preparations are indispensable."

This has been my conviction from the beginning, as I said here during my confirmation hearings in June 1981. Careful, analytical, and thorough preparations were the hallmark of our INF and START positions; and they are the essence of our approach to the problems of arms control potentialities for space.

But the military implications of scientific and technological developments for outer space, and the implications as well of Soviet space programs, present a series of daunting problems. In my judgment, it would be the height of folly to rush into negotiations on these subjects unless we are ready with verifiable proposals that will enhance national security.

The electrifying launch of Sputnik took place in 1957. A year later the United States launched its first satellite. Thirteen years have passed since Armstrong first put man's footprint upon the moon. The launching of satellites has now become commonplace, and with the new Space Shuttle, manned space flight will occur on regular schedule. Yet, custom has not staled the power of outer space to enchant us, to provoke our imaginations, and to stir our hopes.

One such hope—reflecting mankind's deep longing for peace and the wish to use space for the benefit of all mankind—has been to make space a sanctuary from the conflicts that beset us here on Earth. This is a noble aspiration, and we all share it. Yet, we must recognize that outer space is not a distant place way out there. Missiles traverse outer space. The orbits of satellites can carry them close to every point on the globe. Satellites thus occupy important vantage points for military functions—both those which threaten us and those which protect the security of the United States and is allies. For this reason, we cannot regard space as a place totally apart—it is an inextricable element of our national security concerns.

The United States has sought, through such major international agreements as the Limited Test Ban and Outer Space Treaties, to control and to limit arms in space. President Reagan reaffirmed, in his recent announcement of our national space policy, that the United States will consider verifiable and equitable arms control measures that would ban or otherwise limit the testing and deployment of specific space weapons systems, if such measures would enhance our national security.

In my remarks today I shall first review briefly some existing international space law, then address international discussion on space arms control, and finally talk about some of the complexities of space arms control that drive the prospects for meaningful progress.

The United States is a party to a number of bilateral and multilateral treaties, including the U.N. charter, that constitute significant arms control achievements and impose other constraints upon military activities in outer space.

Among the bilateral and multilateral treaties that bear upon military activities in outer space are the following:

The Outer Space Treaty, signed and ratified by the United States in 1967, is currently the principal international agreement addressing space-related activities. It prohibits the placement of nuclear weapons or any other weapon of mass destruction in Earth orbit, the installation of such weapons on celestial bodies, or the stationing of such weapons in outer space in any manner. It specifies that the Moon and other celestial bodies are to be used exclusively for peaceful purposes, provides for reciprocal inspection of stations, installations, equipment, and space vehicles on the Moon and other celestial bodies, and requires that all activities in outer space be conducted in accordance with international law, including the Charter of the United Nations.

The treaty prohibits the following activities on celestial bodies: The establishment of military bases, installations or fortifications; testing of any type of weapons; and the conduct of military maneuvers. However, military personnel may be used for scientific research or any other peaceful purpose and any equipment or facility may be used for peaceful exploration. The treaty also provides that any activity or experiment which would cause potentially harmful interference to another party's activities shall not be conducted without appropriate international consultations.

As far as the charter of the United Nations is concerned, article 3 of the Space Treaty confirms that its provisions are specifically applicable to outer space. What is most germane to our problem are the provisions of article 2(4), that states may not in their own installations use force or the threat of force against the territorial integrity or the political independence of any state, or in any other manner inconsistent with the purposes of the United Nations and the provision in article 51 that nothing in the charter shall interfere in any way with the inherent right of individual or collective self-defense.

The Limited Test Ban Treaty prohibits nuclear weapon tests or any other nuclear explosions in outer space.

The Anti-Ballistic Missile [ABM] Treaty prohibits the development, the testing, or deployment of space-based ABM systems and their components. That is in article V. It also prohibits interference with national technical means of verificaton, which include satellites. There are comparable prohibitions on interference with national technical means and the SALT I Interim Agreement.

The Environmental Modification Convention prohibits military or other hostile use of environmental modification techniques as the means of destruction, damage or injury to any other state party if such usage has effects that are widespread, long-lasting, or severe. These terms are defined in a separate understanding, and environmental modification techniques are defined as any technique for changing, through deliberate manipulation of natural processes, the dynamics, composition, or structure of the earth or outer space.

It goes without saying that all U.S. space programs are in full compliance with these requirements.

I turn now to recent international discussions of space arms control and what we have learned of its difficulty.

In 1978–79, as you said, Mr. Chairman, the United States and the Soviet Union engaged in bilateral negotiations on antisatellite weapons limitations. The talks covered both limits on actions against satellites and limits on capabilities for attacking satellites. They took place in Helsinki in June 1978, in Bern in January–February 1979, and in Vienna in April–June 1979.

During the first round of negotiations, the two sides outlined their general concerns, and during the second and third rounds some progress was made in examining and clarifying the key issues. However, important areas of disagreement emerged, both with regard to limits on actions against satellites and with regard to limits on ASAT capabilities.

I do not wish to belabor those differences here. I would note that there were important verification questions raised which must be resolved if ASAT arms control is to make progress, and I will return to these questions in a few minutes.

In addition, as you will recall, the international environment deteriorated toward the end of 1979. The Soviet invasion of Afghanistan was especially important in this connection.

Arms control measures for outer space have been a topic of discussion in the United Nations and in sessions of the Committee on Disarmament [CD] this year. The United States supported resolution 36/97C, introduced by U.S. allies at the U.N. General Assembly last fall, which requested the CD to consider the question of negotiating further arms control measures in outer space.

In the summer of 1981, the Soviet Union sent to the U.N. a draft treaty that would ban the stationing of weapons in outer space. A U.N. resolution sponsored by the Soviet Union and its allies, calling for CD negotiations on such a treaty, also passed the General Assembly. The Soviet draft treaty neither defined a "weapon" nor seriously addressed questions of verification. In the 1982 spring and summer sessions, the United States participated in CD discussions on the highly complex, technical issues of space arms control.

We are deeply concerned about the wide-ranging scope of Soviet military activities in space—in particular the continuing Soviet deployment, development and testing of weapons for intercepting and destroying satellites, and the threat posed by Soviet satellites to our own military forces. Soviet development of ASAT weapons puts at risk not only U.S. satellites vital to national security but also the satellites of all nations which have been launched and are used for commercial, scientific, and other civil purposes.

This past June, at nearly the same time that Soviet Foreign Minister Gromyko was speaking before the U.N. about banning weapons from outer space, the Soviet Union was conducting another in a continuing series of tests of its ASAT weapon, which we have considered operational for more than a decade.

Finally, in connection with the U.N. and CD discussion, I should emphasize some of the broad problem areas we see. Military and arms

control issues in outer space are complex; they present difficult obstacles to international negotiations, as you and I agree, Mr. Chairman. Furthermore, arms control in space is inseparable from broader arms control issues, and must be considered in that context. President Reagan continues to give serious attention to the prospects for space arms control that could contribute to U.S. national security. However, there are obstacles to progress in such areas as assuring effective verification, minimizing so-called residual ASAT capabilities, and countering the space components of threats to U.S. forces.

Some of these issues are technical ones for which we are seeking technical solutions. Such solutions are essential to any responsible and effective approach to space arms control.

The first question to be addressed in evaluating the wisdom of limits on space weapons in general and ASAT weapons in particular is whether the United States can afford to give up acquiring an ASAT weapon of its own. Two issues are important here. The first is the threat posed by present and prospective Soviet satellites to our military forces. There are a number of Soviet satellites that can be used to direct Soviet military forces against United States and allied forces. Any space weapon limitations which limit the threat to U.S. satellites will necessarily protect threatening Soviet satellites as well. Therefore, when we consider arms control limits on ASAT weapons, we must weigh how we are to balance two national security concerns, the need to preserve our own satellites versus the need to protect U.S. forces from threatening Soviet satellites. Dr. DeLauer will review these technologies in detail.

A further complication is that a ban on ASAT's could not completely banish the threat. Some inherent ASAT capabilities or potential would remain in other weapon systems and space programs. This residual ASAT threat must also weigh in our evaluation.

The second important issue with regard to the U.S. acquisition of an ASAT weapon of its own is the deterrent effect such a system would have in contrast to the asymmetrical situation that confronts us at present. The Soviets have been conducting space tests of their ASAT interceptor for over a decade and are judged to have an operational ASAT system. The United States, on the other hand, has not yet conducted tests of the ASAT interceptor it is developing.

Any interruption in the U.S. program at this time would leave the Soviets with both a ready ASAT capability and a considerable body of ASAT test experience from more than a decade of testing. Additionally, the threat to our national security from advances in Soviet space programs will grow. Finally, the knowedge that the United States is making steady progress toward an operational ASAT of its own could be an important inducement for the Soviet Union to explore constructive limits on space weapons.

The second set of problems we face in evaluating the wisdom of negotiating limits for ASAT and outer space weapons is that of verification.

Effective verification is central in all arms control; it is important in space arms control for several particular reasons. Satellites which serve U.S. national security purposes are relatively few in number and yet in many instances they are vital and their tasks cannot readily

be taken over by other systems. A variety of weapons could potentially be used for ASAT attacks, including some weapons such as certain ABM interceptor missiles that are permitted under other arms control accords.

If the Soviet Union should succeed in destroying even a small number of vital American satellites, while its own remain immune from attack, it might hope to secure an important military advantage in some cases. In these circumstances, even a few acts of cheating to acquire or retain a modest ASAT capability could have significant national security implications.

We would thus, under a complete ASAT ban, have to insure both that the existing Soviet ASAT system was dismantled and could not be readily reassembled and that no other Soviet systems could effectively perform this mission. There are, in addition, other verification problems. Without effective verification, an ASAT ban would simply not be in the U.S. interest.

ACDA and other agencies are studying possibilities for cooperative measures that could supplement national technical means to provide effective verification of space arms control agreements. However, the problem remains an extremely difficult one, and I cannot report any breakthroughs at this date.

These are enormously complex issues, involving not only evaluation of existing space and weapons technology but also the anticipation of future developments; space technology is evolving at a rapid rate, and these advances bring with them implications for the use of space, space weapons, and of course space arms control. We know that future developments may be important for our security, and yet our vision of the future is unavoidably clouded.

I mentioned, Mr. Chairman, in my opening remarks that outer space was an inseparable element of our broader security concerns. Space arms control, too, is inextricably linked to our broader arms control initiatives. The President has now made a series of arms control proposals to the Soviet Union, on strategic and intermediate range nuclear missiles and on conventional forces in Europe. The outcome of these negotiations will have a profound effect upon our security concerns and upon our defense forces and requirements. Satellites serve the needs of both arms control verification and of defense. Hence, the demands we will place upon our satellites, and the risks we would be willing to accept under space arms control limitations, must be influenced by the course of these other negotiations.

I remarked in a speech I made last week in Los Angeles summing up where we stand in the INF talks in Geneva that a serious atmosphere has evolved in those talks, and that we have come far enough to make it obvious that the analytical concepts used by both sides can be reconciled, but I said that what is not yet clear is whether the Soviet Union is willing to consider an agreement in the INF talks based entirely on the principle of deterrence. That is the fundamental issue that is being explored there and will be explored in the START [Strategic Arms Reduction Talks] negotiations and the MBFR talks, and it is critical to the possibility of space arms control as well.

The issues I have briefly discussed here today have been and are being actively and carefully reviewed by the administration. One of

the products of that review was the President's recent far-reaching decision on national space policy. He said that the administration will continue to study space arms control options and will consider verifiable and equitable space arms control measures that would ban or otherwise limit testing and deployment of specific weapons, should those measures be compatible with U.S. national security.

We are vigorously pursuing these issues, Mr. Chairman, with studies such as those on cooperative measures I cited above. I cannot predict we shall surmount the obstacles to meaningful space arms control, but should we see a potential for verifiable space arms control measures that enhance the U.S. security we are ready to take appropriate initiatives.

Thank you.

Senator PRESSLER. Thank you very much.

Dr. DeLauer, do you have any comments?

Dr. DELAUER. I will wait until you finish, Mr. Chairman.

Senator PRESSLER. I will ask my questions of Mr. Rostow first, and then call you forward.

Recently some of the development in this area were published in a Jack Anderson column based upon research I have conducted. My research points out some of the accelerated steps that are occurring on both the Russian and the United States side. For the United States, this is a very expensive undertaking. The U.S. Air Force created a Space Command on September 1 of this year. The U.S. ASAT is said to be approaching flight test, and once deployed in the second half of the 1980's it will leapfrog the operational Soviet killer satellites, but it may be answered by the Soviets with a more advanced piece of technology.

On July 4 of this year, President Reagan announced that the United States was adopting a new national space policy. Among other things, this policy calls for the development and deployment of an operational ASAT capability, and the most recent space shuttle flight marked the first time that this vehicle was used to transport a military payload. Plans call for allocating one-third of the shuttle's payload for military missions. The budget of the Air Force's Space Command, colocated at Colorado Springs with the North American Air Defense Command, will increase from $2.9 billion in fiscal year 1982 to $4 billion in fiscal year 1983. The Space Command will coordinate all U.S. military space programs and it will operate the U.S. ASAT.

DOD is currently spending about $300 million a year on laser research. This could help pave the way for a space-based laser weapon in the next decade or beyond.

I am sure you are aware of all of these things, but the point is, we are getting into this space race at a very fast rate, are we not? It seems that if this pattern continues, we will be spending just an enormous number of billions of dollars on space weapons. I understand the Soviets did offer a new space treaty at the U.N. last year. Was it at the U.N. that they proposed this?

Mr. ROSTOW. Yes, sir.

Senator PRESSLER. The Soviets have floated a proposed treaty.

Mr. ROSTOW. Yes, sir, I referred to that.

Senator PRESSLER. What is your response to that?

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Mr. Rostow. Well, it presents certain problems immediately. It was proposed in August 1981, and the proposal was to ban the deployment in outer space of weapons of any kind, but one of the difficulties was that there was no definition of weapons offered, and the provisions with respect to verification were very sketchy. Our response to that treaty proposal is part of the general response to the potentialities for arms control in space to which I referred in my prepared statement.

That is, we are eagerly looking at these potentialities. We completely agree with you and others about the potential cost of any competition in the field of weapons for outer space. The United States has been very slow in responding to the Soviet initiative, in developing weapons for outer space. I remember we were conscious of that risk in the late sixties, when I was here in the State Department, and our response to the Soviet proposal of August 1981, is part of our continuing active study of the possibilities of this field, to try to determine what our policy should be.

Senator Pressler. Are we going to respond by making a counter offering? The Soviets have offered a draft space weapons treaty. If we are not satisfied with it, do we have a draft space weapons treaty that we are prepared to offer or have offered?

Mr. Rostow. No, we have not offered any such treaty. We have not reached any conclusion in our study. I said at the very end of my prepared statement, should we see a potential for verifiable space arms control measures that enhance our security, we are ready and I should say eager to take appropriate initiatives.

Senator Pressler. Why don't we have a draft treaty? Why doesn't the U.S. Government have a proposal? The Soviets are outmaneuvering us here, they have a proposal. If we are serious about negotiating this, as you say we are, why don't we have a proposed draft treaty?

Mr. Rostow. Because of the difficulties of the problem, because of the problem of preparation. As I told you and this committee when I was up for confirmation back in June 1981, I am opposed to and the administration is opposed to moving forward into negotiations unless we have a solid footing for those negotiations. That is the gist of the advice we got from Lord Carrington a year or so ago that I mentioned in my opening statement.

I think it is right. I do not think we should try to use negotiations as a way for working out our policy. I think we should work out our policy first, and sometimes, as in this case, it is an extraordinarily difficult task.

Senator Pressler. Yes. Well, both sides, both the Soviets and the United States are launching into this expensive race, and yet we say that we are not yet ready to start talking. I think we should both have some talks in this area, and I believe we should have a proposal of our own. Indeed, I know it is difficult to draft a proposed treaty before talks, but how do we get this process started when we do not have talks and we do not have a proposed treaty? How do we start negotiating in this area?

Mr. Rostow. But we have had talks.

Senator Pressler. But they have been cut off, have they not?

Mr. Rostow. They have sort of faded away in any event.

Senator PRESSLER. Were they not shut off? Did they fade away or were they deliberately shut off?

Mr. ROSTOW. Well, I was not part of the administration in 1979, so I cannot report on that.

Senator PRESSLER. But they faded away.

Mr. ROSTOW. But they faded away in the atmosphere of late 1979. The fundamental position of the administration is that while we are working hard on this subject, we are not yet ready to resume those talks, and certainly not yet ready to negotiate. We are trying to assess and evaluate all aspects of this complex problem. After all, there are many dimensions of the space problem that are defensive and constructive, even though they are military. For example, the use of satellites for surveillance. They come out of President Eisenhower's open skies proposal. They helped to overcome the traditional and historic reluctance of the Soviet Union to allow inspections and free visits and so on, and they are absolutely indispensable to many aspects of our military as well as our civil programs these days.

So that to determine, to try to isolate outer space from the military sphere, to try to end all competition in the area of space has been our yearning and our posture, but exactly how to do it beyond the prohibitions already enacted in the Outer Space Treaty and the Limited Test Ban Treaty is a very daunting challenge.

Senator PRESSLER. I have one more question, and then I am going to yield to Senator Percy, who has another subject that he wants to raise. But first, let me say that with the increasing use of satellites for communication, we are growing dependent on stability in outer space. I also serve on the Communications Subcommittee of the Commerce Committee. In another 10 years, we could be transmitting most of our communications, news and weather, via satellites. We are increasingly depending on satellites for agricultural information. Those are peaceful uses, of course, but if another country had the capability to destroy or disrupt our space systems, we would be in a position where we would be very vulnerable from a point of view of national defense as well as of agriculture and other areas that are related. This is why this is increasingly important.

What about linking space talks and the START talks?

Mr. ROSTOW. My first reaction to your suggestion, Mr. Chairman, is that the problems in the START talks are already complicated enough. I think the Outer Space Treaty already prohibits weapons of mass destruction of any kind to be stationed in outer space, so that the specific subject of the START talks, the intercontinental ballistic missiles and other nuclear weapons, the so-called aggressive nuclear weapons, are already covered so far as outer space is concerned, at least with respect to the emplacement of such weapons there.

The other aspects of the space problems are extremely important, potentially very important but we are not yet clear, as I said, what our policy should be.

Senator PRESSLER. How soon do you think we will be clear? I will pursue that with you later.

Senator Percy has arrived with a statement on another related subject. Senator Percy, the chairman of our committee.

The CHAIRMAN. Mr. Chairman, I would ask that the record continue for continuity purposes with all of your questions prior to my questions.

I did not see your testimony until I arrived back from Chicago this morning. I canceled a meeting with the State Department at 10 o'clock so that I could get here. I was pleased during your confirmation hearing, and you made reference to it in your testimony in April that you would support within the administration the ratification of the Threshold Test Ban [TTB] and the Peaceful Nuclear Explosion [PNE] Treaties. I was very pleased at that.

Two months ago, on July 29, we had a consultation on this subject. You informed this committee that the administration had completed its 1½-year review of the Threshold Test Ban and Peaceful Nuclear Explosion Treaties, treaties that were long ago signed by Presidents Nixon and Ford. At that time, I was pleased to learn that the administration had agreed to seek ratification of these valuable accords, given modest improvements in the verification arrangements. I was especially pleased to learn that you would be prepared to return to this committee by October 1 with the administration's proposals for verification enhancement which you would then take to the Soviet Union.

Is there something wrong in my assumptions? I saw your hand go up there.

Mr. ROSTOW. Yes. Only one amendment, which I hope is a minor amendment, and that is, I think I said, or I should have said, shortly after October 1, which was the deadline internal to the Administration for the submission of views.

The CHAIRMAN. I will ask that the staff reread that record and insert it at this point in the record. I have not read it, but I have a recall that we agreed on October 1, and I would be surprised if my understanding was not fairly clear by the record.

[The material referred to is classified and is retained in committee files.]

The CHAIRMAN. Here is a letter handed to me by staff dated August 27, signed by Thomas Graham, Director, Office of Congressional Relations and Public Affairs, the last paragraph of which reads—it is a nonclassified letter—"It is our hope that the interagency study will be completed by October 1." Now, that was the date we talked about. I remember October 1.

Mr. ROSTOW. I do, too. I am making only the most minor technical modification, but the October 1 deadline, if I misspoke then, was for an internal submission. as Mr. Graham said in his letter.

The CHAIRMAN. I have learned all through my life, not just in Government, but in business as well, never to be fuzzy about dates. You know, "approximately 2 months from now" could mean "2½," or "3," or "4." And I wanted to be very precise, and October 1, I think, was the agreement we reached.

For several years now, I have urged the administration, privately to you and publicly a number of times, that we moved forward with these accords. Though they are modest in content, the Threshold Test Ban and the Peaceful Nuclear Explosion Treaties set important precedents on data exchange and on on-site inspection which would prove

invaluable in the START talks. Moreover, ratifying these accords would be an important demonstration to our friends and allies and to the Soviet Union leadership that the United States is capable of ratifying signed accords, and this is what I want to prove, that the Senate can, if President Reagan supports ratification. I think it is a great incentive for them to bargain in good faith in the START talks.

However, despite the assurances that I have that we would be prepared to proceed by October 1, staff advises me that when they contacted your office to ask for a consultation on October 5, we were then advised that you were not prepared to inform this committee of the administration's position on these two treaties until December 10. Is that correct? Is that your understanding as to the earliest date that the administration would be ready to discuss its proposals for verification modifications which would be acceptable to the Senate and the administration? Will it take 2 months to work those out and get them ready to present to this committee? December 10 really means, so far as we are concerned, the next Congress, not the next Congress, I mean, the next session.

Mr. ROSTOW. No, the next Congress.

The CHAIRMAN. Let's put it this way. You doubled the amount of time. What happened?

Mr. ROSTOW. When I came back from my holiday at the beginning of September, I heard this report. It is not, so far as I know, a fixed administration position. Quite the contrary. And I immediately made some telephone calls and talked to some colleagues about exactly where that report came from and what it means. I am now engaged in the process of trying to unravel the report which was given to you, and to discuss it with my senior colleagues in the various branches of the Government.

So, I am at the moment not in a position to confirm or deny the report. I hope it is not correct, and I hope that we will be able to meet the deadline that you and I discussed in that earlier hearing.

The CHAIRMAN. You would still be aiming for the October 1 deadline?

Mr. ROSTOW. I am strongly of the opinion that we should aim for that decision early in October.

The CHAIRMAN. So that we could look forward to a hearing on October 5 then?

Mr. ROSTOW. No, I would think that October 5 is probably premature in any event, because we ought to give the decisionmaking process at the top a little bit more time, but if an October 1 deadline for submission can be restored, or something like it, then we ought to have the possibility of hearings within this session.

The CHAIRMAN. Dr. Rostow, I am not worried about the decisionmaking at the top. I have seen that decisionmaking process operate. So have you. And when it is a matter of importance and a commitment made to the Congress, they do not break their commitments to us. They move.

Mr. ROSTOW. No, no.

The CHAIRMAN. What I am worried about is the boll weevils at the bottom, the stonewalling that you mentioned yourself, a phraseology with which I agree, but I did not originate it. It was your origin. You

indicated to us during the July 29 consultation on the administration's policy with regard to these two treaties that there was general agreement within the Government to proceed with ratification, given improvements in verification arrangements. Has this agreement in any way collapsed or been endangered or impaired?

Mr. ROSTOW. The agreement, so far as I know, remains what it was. There has been some further pressure for delay. Whether boll weevils are stonewalling, to combine our two metaphors, I am now trying to find out.

The CHAIRMAN. The reason I press on this is because if we cannot meet on October 5, which was giving you 1 week's grace practically, then we are going into recess. The Senate will not be here. On a matter of this urgency, I will come back myself at any time and cancel anything, but it is not fair to have the committee meet in recess on important matters that affect two treaties that two former Presidents both have gone out of their way to impress on this administration and on this Congress and on this committee the importance in their judgment. Both Presidents, Nixon and Ford, time and again have impressed upon us the importance of ratifying these treaties.

Now, in hearings before this committee at the end of last year, then Chairman of the Joint Chiefs of Staff, General David Jones, asserted that the 150 kiloton threshold in these treaties would not impinge upon the U.S. strategic modernization program. Does the administration continue to support General Jones' view?

Mr. ROSTOW. Subject to appropriate improvements in verification procedures and assurances on that front, I believe that is still the case.

The CHAIRMAN. Then that question is not under debate. It is just simply a procedural question of whether the bureaucracy can move. We have had 1½ years on this subject, which I campaigned on 18 years ago as the paramount subject facing mankind, and I have not changed my opinion. You have not changed your opinion, Dr. Rostow. You would not have given up your life to take on this kind of a job with the kind of problems you have faced if you did not believe this. It is not always the most pleasant work—you can find a lot more pleasant work and sometimes productive work possibly—with the obstacles that you face, but that is the question. Can we not get going on this thing? Clearly, I would like the last question to be, does the new delay indicate the rise of that profound stonewall of opposition within the administration to proceeding with these accords? Does it in any way imply that it is a triumph once again for arms control opponents within the administration? That is what worried me and what caused me to cancel my schedule today to talk to you at this hearing.

Mr. ROSTOW. I appreciate, sympathize with, and agree with the thrust of your comment, and I hope and believe that the answer to your question is no, that this report of delay does not indicate the triumph of those who are opposed to arms control agreements. I say I hope not, and I promise you that I shall continue to put forward my best and most energetic efforts to make sure that it is true.

The CHAIRMAN. Well, certainly in this regard you and I are allies, not adversaries. I commended you at the time of your confirmation hearing on your assertion that you would support within the admin-

istration ratification of these two treaties, strongly supported by two former Presidents, Republican Presidents. If I can help tear that stonewall down, if you will identify who the builders of it are to me, if you know who they are, let me know and let's both of us work on these people. If there is some national security reason that someone can point out to us, I could understand, but I have gone to the best authority I could, the Chairman of the Joint Chiefs of Staff, and he said there is no need for higher-yield testing. I now hear that you hope there is no change in this. Let's find out if there is any. If there is, let's see what we together can do about it, and let's have a victory for the Arms Control Agency, because time is running.

We are at 20 months in this administration. The Chicago Sun Times carried my endorsement of the President, and they endorsed Carter. I quoted the President as to what he told me as we campaigned together on his attitude toward arms control, and I have applauded the proposals that he has made. I think the Soviets have taken them seriously. They were not dismissed out of hand the way the Carter proposals were. They were keenly crafted to be good positions, reasonable positions that would appeal to our allies and the world, and the Soviet Union had to respond.

Now, they are responding in a way that we will not accept, but it is a basis for discussion. We want to get going. I cannot impress upon you enough the incredibility that the Politburo—and I sat and faced members of the Politburo 1½ years ago—had about the possibility that they, after 7 years of negotiating three separate treaties, could get even one treaty out of the U.S. Senate. We have not had one ratified for 7 years. Seven years of negotiations, and they cannot even get one, and two of the treaties were signed by Republican Presidents.

The question put to me was: Will a Republican President stand behind the treaties of other Republican Presidents, even if he will not stand behind SALT II? I said, I will find out. And I did find out. Your statement was public. The question is, do you and I have any clout with this administration. I think we are both at test. If there are people standing up against these modest, modest steps, when the Chairman of the Joint Chiefs of Staff says it impedes not at all what we intend to do in our strategic program, then I can only say in utter frustration, Gene, let's you and I get together and work on this, and let me know what I can do to help you accomplish this purpose.

Thank you very much, and thank you, Mr. Chairman.

Mr. ROSTOW. I shall.

Senator PRESSLER. Senator Percy, may I say that I recall October 1 being mentioned once in a conversation between myself and Senator Mathias and the Agency.

The CHAIRMAN. Thank you.

Senator PRESSLER. A followup question to my previous line of questioning is, given reports that the U.S. ASAT weapon is soon to be tested, would that complicate the problem of verifying an ASAT accord?

Mr. ROSTOW. I am sorry, did I miss a key verb there?

Senator PRESSLER. Press reports suggest that the U.S. ASAT weapon is soon to be tested; would this be a further complication for negotiating a verifiable ASAT accord?

Mr. ROSTOW. No.

Senator PRESSLER. You indicated that there was a lot of difficulty in getting started. Here is my basic question. There seems to be a stickiness, a slowness, a reluctance to get started on talks about this. I sense this on your part. Maybe there is a reason based upon national security for not proceeding now?

I am one who has believed very strongly that Ronald Reagan is in a unique position to negotiate arms control treaties because he has the trust of those who would traditionally oppose such accords. As I have said, just as Richard Nixon could go to China, Ronald Reagan could enter into arms control. But the point is, the Russians have a proposed treaty, we do not have a countertreaty proposed. You feel strongly that we cannot make it a part of the START talks because it would complicate the process. You feel that we are not prepared to resume talks because we just do not know where we are, apparently.

But the sense that comes forward to me, is a stickiness, a slowness, a reluctance about proceeding with arms control in space. Maybe there are national security reasons that we should not be entering talks on limiting the prospects of war in outer space. I would rather have you say that.

What initiatives are we taking?

Mr. ROSTOW. I think we are talking about two different things, Senator Pressler. You say that the Soviets have tabled a draft treaty and we have not responded to it or tabled another draft treaty, so that politically and in the realm of images and appearances they are ahead in some sense.

But they are not ahead. The point about it is, we do not really know yet what we want in the area of space. I took a great deal of flack for the statement I made, of course, at my confirmation hearings that I did not know anybody then in the U.S. Government who knew exactly what to propose, and I said we would make an effort to develop some proposals, and we did.

By the fall of 1981, there was a consensus within the U.S. Government on how we should approach the INF and the START problems, and I continued to believe that the advice that Lord Carrington gave to me and to Ambassador Nitze was sound, namely, that if you move into these negotiations without full preparation, without a very solid and carefully crafted set of ideas as to how to go about it, you are making a profound mistake. You do not go into the negotiations to discover what the problem is.

We are now deeply involved in well-prepared negotiations where we have laid down positions, where we are very confident about what we want and do not want. And we should know soon exactly what the Soviet attitude is toward the possibility of arms control agreements based on the principle of deterrence.

Now, are we now in a comparable position with regard to the possibility of arms control about outer space? We fully share your view and every other responsible person's view that we certainly do not want another competitive arms race in a new and expensive sector of the military front. But what is involved here involves changing per-

spectives in a new and murky area of science and technology, and the U.S. Government has not sorted out its position on these matters and none of us would know exactly how to draft such a treaty, which form of treaty would be in our interest.

Surely, as a political gesture tabling a treaty would be a good thing, but substantively it would not, for the reasons I tried to explain here. Neither the United States nor the United States and the Soviet Union together, nor any other group of countries, have the power nor would wish to have the power to suppress and censor science and technology. That is the real problem.

I might add, Mr. Chairman, that adding the outer space problems to the agenda of the START talks really wouldn't alter the problem in any way. The issues would be just the same.

Senator PRESSLER. Some analysts contend that any missile can be used as an antisatellite weapons launcher, thereby making verification of any ASAT agreement difficult. Do you agree with this assessment? If so, how would you propose to deal with this problem?

Mr. ROSTOW. I referred to it in my prepared statement, and it is a matter of immense concern. I suggest that you ask Dr. DeLauer that question. He is technically very well qualified to answer it with confidence and I am not.

I will have to reach an opinion, evaluating the advice of the experts sooner or later.

Senator PRESSLER. Has there been any meaningful movement on space arms control at the summer session of the Committee on Disarmament in Geneva?

Mr. ROSTOW. The issues have been canvassed. I referred to the discussion here. There has been a clarification, I think, of views, but nothing like a clear pattern of opinion emerged.

Senator PRESSLER. On the subject of the Threshold Test Ban and Peaceful Nuclear Explosion Treaties, I have a statement to include in the record.

[Senator Pressler's statement follows:]

STATEMENT OF SENATOR PRESSLER ON THE THRESHOLD TEST BAN AND PEACEFUL NUCLEAR EXPLOSION TREATIES

I have been a long time supporter of ratifying the Threshold Test Ban and Peaceful Nuclear Explosion treaties. My reasons for doing so appear in an op. ed. article I published in the Washington Post in May. I ask that it be printed in the record of this hearing.

On July 29th, Dr. Rostow told this Committee that a consensus favoring ratification had been built within the Administration. We were told that all that was needed was slight improvements in verification arrangements. At that time, critics claimed that these assurances added up to little more than stall tactics. When we were told that enhancements in verification arrangements could be produced in two months, I dismissed the criticism.

I am deeply troubled by the news that Dr. Rostow will not be in a position to present the findings of the TTB/PNE verification review until December 10th. This delay suggests that we are back to square one. Ratification seems to be no closer today than it did two months ago or even two years ago. I fear that we are in danger of losing the valuable standards set by these accords in the areas of data exchange and on-site inspection. Mostly, I fear that the critics may be right.

[From the Washington Post, May 28, 1982]

TWO TREATIES READY TO GO

(By Larry Pressler)

In moving toward a major breakthrough on strategic arms reductions, let us not forget the need for some modest but important steps in the interim. In this, consideration should be given to the ratification of two negotiated and signed accords limiting nuclear weapons tests, the Threshold Test Ban (TTB) and the Peaceful Nuclear Explosion (PNE) treaties.

The TTB and the PNE were negotiated and signed between 1974 and 1976 by the Nixon and Ford administrations. The TTB prohibits all weapons tests with yields greater than 150 kilotons. The PNE accord places the same constraints on so-called peaceful nuclear explosions. The Soviets have looked favorably toward PNEs and the United States has not. The United States has concluded that in most instances chemical explosives are sufficient for civil projects, and they avoid the radioactivity problems associated with PNEs. For this reason, the PNE treaty will have a greater impact on Moscow.

Some quarters in the bureaucracy advocate that we not ratify the TTB and PNE so that we can retain the option of testing high-yield weapons. But as Gen. David Jones, chairman of the Joint Chiefs of Staff, has indicated, there are no plans for such tests; nor is there any real need to conduct them. Assuring reliability of our current stockpile of weapons can be achieved under the 150-kiloton level. Moreover, the Soviets are in a better position to profit from a move toward high-yield testing than is the United States. Moscow has ready-made facilities for such tests; we would have to start from scratch. These are few guarantees that Congress would fund such a program if we rather than the Soviets initiated testing above the threshold.

More important still is the likely impact of the 150-kiloton level upon the Soviet arsenal. The Soviets have long held a preference for multi-megaton weapons. These agreements would, therefore, be far more restrictive on them. If doubts on weapons reliability arose, this would first occur in Moscow. In the long term, moreover, the agreements might add to strategic stability. As new weapons came on line, their warheads would have to be tested to assure reliability. Likely Soviet doubts on the effectiveness of untested weapons might act as an incentive to move away from monster first-strike warheads.

Perhaps the most important provisions in these agreements deal with verification. The TTB provides for the exchange of geological and other test-related data required to assure compliance. The PNE's verification provisions are unprecedented. For the first time, the Soviets have agreed to on-site inspection.

The Reagan administration has made Soviet cooperation on the exchange of military data and on intrusive verification a litmus test of Soviet sincerity in arms restraint. The president's important strategic reductions initiative will depend on progress on these issues. The PNE and TTB offer Soviet concessions on both counts.

Support for ratification of these agreements has recently come from a broad spectrum of individuals, "hawks" as well as "doves." The group includes a stream of witnesses from the administration and the wider national security community who have testified before the Senate Foreign Relations Committee.

Since 1976 we and the Soviets have lived by these agreements—neither side has tested above the 150-kiloton level, and both have issued statements promising to adhere to the threshold as long as the other side does the same. But only ratification would bring the real benefits. Only then would the Soviets provide the data promised during negotiations and only then would they be bound to allow on-site inspection.

The writer is a Republican Senator from South Dakota.

Senator PRESSLER. We in South Dakota, are interested in what is going to happen to the MX missiles. Dr. Rostow, press reports indicate that the Defense Department would like to proceed with DENSEPACK basing of the MX missile. Do you believe that the resumption of high-yield tests by the Soviets could allow them to perfect the kind of high-yield weapon that could defeat the MX survivability features claimed for DENSEPACK?

Mr. ROSTOW. Again, I have heard that issue discussed. I am not qualified to testify about it, but Dr. DeLauer is.

Senator PRESSLER. Well, all right, I will ask him.

Let me conclude by thanking you for being here. And to conclude, the message I hear from your testimony—and maybe I am wrong—but it is the same message I hear when the TTB and PNE treaties are delayed nearly 2 months. I sense a slowness, a reluctance, a half-heartedness. Although you say you are in favor of outer space arms control, there are no initiatives being taken. At least, that is the way I view it. It would seem to me that we could enter into this area without giving enough attention to its consequences. If we cannot slow the weapons war down on Earth, we can certainly be doing something about slowing it in outer space.

And I know that you have noted some of the obstacles, but I remain unconvinced that we should not be doing much more, moving more aggressively, taking a lot more initiative in all of these talks, tying space talks to START, moving in Geneva on this subject, proposing or offering a counterproposal to the Russians at the United Nations. There are all kinds of fronts we could be moving in without endangering national security.

Mr. ROSTOW. I might respond, I appreciate and respect your view, but that my position on this subject is what my position was on the nuclear arms talks in June 1981. And I would remind you that in the fall of 1981, a few months after I made that statement here, we were ready with positions which emerged into negotiating positions and draft treaties shortly thereafter.

So don't give up hope. We are not being sticky or slow or reluctant.

Senator PRESSLER. Well, you always say that, and indeed in July when you were up here for consultations on the TTB treaty we were told that decisions were going to be taken by October 1, and they apparently will not be taken.

Mr. ROSTOW. TTB?

Senator PRESSLER. Yes. We thought these accords were to be proved and, now, they will be delayed 2 months.

Mr. ROSTOW. We are not up to October 1 yet, Senator Pressler.

Senator PRESSLER. I see. Maybe you'll get the review done on time. I certainly hope so. That is a very significant statement that you just made. I will tell Senator Percy that that was your concluding statement. Maybe you will surprise us and deliver an October 1 surprise.

Well, we thank you very much for coming.

I shall now call a man who may know more about my MX question, from the Defense Department, Dr. Richard DeLauer, Under Secretary of Defense.

Secretary DeLauer, do you have a statement?

STATEMENT OF DR. RICHARD D. DeLAUER, UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING, ACCOMPANIED BY DR. COOPER AND DR. LEHMAN

Dr. DELAUER. Yes, Mr. Chairman. I have submitted to the staff, and I would like to enter into the record, my complete statement on

this subject. I would just like to summarize now and then open it up for questions, if that is permissible.

Senator PRESSLER. Good. Maybe you can pull the microphone a little closer.

Dr. DELAUER. I have with me Dr. Cooper and Dr. Lehman, who will assist me in any of these matters.

This morning, as indicated in my statement, I want to emphasize the technical aspects as the space program, since that is the area of the Department of Defense that I represent. First, though, I would like to make a few remarks in regard to the threat, which in our view is Soviet space activities, as Dr. Rostow mentioned in his statement. I will not try to repeat those, but I can state they are growing and they are very significant. The Soviet Union makes no bones about the fact that they are using space for military and security purposes. They regard space as just another medium, which they feel they have all the opportunity in the world to exploit.

As mentioned before, they have had the only antisatellite system for over a decade. They engage in military activities with other space activities, other space assets, such as the space station. And they also have been developing over the last decade also a very extensive directed energy weapons program at a spending level three to five times that being done by this country. It is clear they have a large military space program.

Now, as far as the Department of Defense space activities are concerned, space provides a means, sometimes the only means, to satisfy defense requirements and national security in an effective and efficient manner.

The U.S. military use has always been nonaggressive and it is a well-known fact that they contribute to arms control verification, and hence the maintenance of peace and stability in the world.

There is a current misconception that DOD is militarizing space. It is a misconception. Nothing that we are doing is inconsistent with our activities of the past 25 years or which contradicts international law.

The fundamental direction is reflected in the national policy signed by the President on the 4th of July, in which he stated the policy of using space for peaceful purposes, supporting the right of self-defense while also considering equitable and verifiable arms control for specific systems if it is compatible with national security.

The DOD has a space policy which furthers national policy. It states that we will use space to operationally support U.S. forces, continue the development of an operational nonnuclear antisatellite system—that has been a national policy since 1977. We have to continue this in order to respond to the threat to our particular assets that are in space. A failure to do so would jeopardize our security interests.

The U.S. ASAT program is not a bargaining chip and never was. We have no policy mandate to pursue space weapons. On the other hand, given the Soviet activities and their spending rates, we must continue our research and planning, but we will not do any acquisition unless our security is threatened. Lasers are a military possibility,

but major uncertainties still exist. Our launch activities evolve around the shuttle, which has demonstrated a capability to fly repeated missions, and that is a significant technical accomplishment. It will permit us to deploy, retrieve, service, and repair compatibly engineered satellites.

NASA manages the shuttle and we in DOD utilize their equipment. We have undertaken a satellite control station activity at Colorado Springs that in the future will permit the Department of Defense to control the DOD missions in the shuttle system. The control facility at Colorado Springs backs up the Satellite Test Center that now exists.

In satellite communications, we have activities going to investigate concepts and technology for laser space communications to submarines. For the future, the heart of the military communications system will be a highly survivable satellite system, which will include five geosynchronous satellites for strategic nuclear forces, Navy, tactical ground mobile Army, Marines, and Air Force. It is called MILSTAR.

It will provide worldwide jam-resistant coverage, and it will replace the presently deployed FLEETSAT, LEASAT, and AFSAT. We will also continue the defense Satellite Communications System for vital national security communications, that will support military commanders worldwide, the National Command Authority, diplomatic telecommunications, and other defense communications including those of selected allies.

In the weather area, we will continue with the meteorological satellite program which requires two operational satellites for information from all points on the earth four times daily. We will be deploying a navigation satellite called the Global Positioning System both for our armed services, for civilian use, where needed, as well as for our allies in Europe.

As far as management of our assets is concerned, we are attempting to have more centralized control. That was a basis for creating the new Air Force Space Command. It helps to centralize the management of the Air Force activities in space, as well as to provide a better operational link to the acquisition side of the space business—the Space Division in California. It is not a move toward militarization of space, but, as supported by Congress, would consolidate our activities and provide a proper link between the R. & D. process and the operational users.

It will in turn contribute to increased efficiency, better planning, and thus to deterrence and international stability, by reducing uncertainties. This is one of the aims for the new space command.

In closing I want to emphasize that our best course is the one that will provide us mission support at the least amount of cost. The preeminence of U.S. technology has been and will continue to be the cornerstone of our space program. We must work with Congress to be certain that we remain technologically unchallenged, and we encourage Congress to support our military space programs.

With that, Mr. Chairman, I will open up to questions.

[Dr. DeLauer's prepared statement follows:]

PREPARED STATEMENT OF DR. RICHARD D. DELAUER

Mr. Chairman and members of the subcommittee, I am pleased to have this opportunity to appear before you this morning to review your expressed interest in the status of U.S. military space programs and related Soviet activities. To support me in this presentation, regarding any questions you may have, is Dr. Robert Cooper, the director of DARPA.

SOVIET SPACE ACTIVITIES

I would like to begin with a brief synopsis of the Soviet Union's activities in space during 1982, followed by a review of U.S. directions in space.

Through the first 6 months the Soviets have launched 79 payloads into orbit, as compared to 64 during the same period last year. Should this year's trend continue, the Soviets would exceed their 1981 record high of 124 payloads in orbit. We expect this high rate to continue through the 1980's with the advent of new systems and capabilities. Development continues on new space boosters, one in the Saturn V class, and large permanently manned space stations and complexes. Soviet military space capabilities include an operational antisatellite system; ever expanding communication relay satellite systems to support Soviet ground, sea and air forces; and various satellite networks for navigation and meterology. A significant feature of the Soviet program, and one which has considerable military potential, is their manned program. This program consists of a space station and a space station module. The trends and momentum of the Soviet space program for 1982, as for the past 25 years, reflect a commitment to develop space capabilities that enhance and project military power.

Major noteworthy developments so far this year include the launch of Salyut 7 in May. This 42,000 pound space station followed Salyut 6 which remained active for more than four years. The new space station has already been visited by two, week-long Soyuz missions, one in June and one in August. These short duration missions carried a French crew member and the second woman in space, respectively. This rendezvous and docking capability and the ability to resupply the space station show that the Soviets are well on the way toward their goal of a large, permanently-manned space presence.

The Soviets have also launched various Molyniya spacecraft to maintain their communications satellite network, as well as others to provide civil and military communications relay. Likewise, meteorological satellite networks have been maintained and oceanographic satellites were launched to collect and relay buoy data from the seas.

In March, two Soviet space probes to Venus were successful, one a descent to the surface and the other a planetary fly-by.

I also want to mention that the Soviets previously had registered additional satellites for deployment at geostationary altitudes during the 1980's, including two new geostationary data relay networks for the mid-1980's to provide data transmission to ground stations from low Earth orbiting satellites via the geostationary relay spacecraft.

As you are aware, in June, the Soviets conducted another in a long series of antisatellite tests, further demonstrating their capabilities in this area. These tests clearly represent the value Moscow places on space, and equally important, their willingness to fight to maintain these capabilities and deny others access.

Over the past 10 years, the Soviets are also estimated to have taken the lead in the development of directed energy weapons such as high-power lasers and possibly radio frequency devices. They have devoted substantial resources in these areas, and the fact that they are developing very high-power microwave generation also gives rise to suspicions of possible weapon intent. For example, their high energy laser program is three-to-five times that of the U.S. level of effort and tailored to development of specific laser weapon systems (as opposed to the U.S. work which is largely exploratory). Available information suggests that the Soviet weapon effort is by far the world's largest, and possibly could lead to a demonstrated capability in a wide variety of ground, ship and aerospace applications during the latter half of his decade.

Finally, Soviet spacecraft perform more than a dozen specific military functions, several of which are directly associated with weapon systems. In fact, we believe their space station program engages in military activities and may be the forerunner of a weapons platform. In sum, based on the evidence available to us, it is clear that the Soviets have a massive military space program.

DEPARTMENT OF DEFENSE SPACE ACTIVITIES

Let me turn now to our own activities. Space activities of the Department of Defense are continuing to expand, maintaining the trend of the past few years. The increased funding that our space systems are receiving within the Defense budget is tacit recognition of their growing importance (20 percent real growth per year over the current 3-year period). Space systems have become an important part of our force structure, providing support to such critical functions as command and control, communications, navigation, weather, and warning. This support is a significant factor in improving the effectiveness of our forces. To ensure that our space assets can support our military forces in the event of war, we are also improving the survivability and endurance of space systems, to include their ground support functions.

However, I would like to emphasize that the use of space by the DOD should not be interpreted to mean that the United States is "militarizing" space as some claim. This misunderstanding has developed recently, based primarily on a variety of misconceptions about space activities in general. In effect, we are doing nothing in space which either contradicts the existing international legal regime, or goes beyond what we have been doing over the last 25 years. The fundamental direction for DOD space activities is found in the new national and DOD space policies.

The DOD space policy is in furtherance of the national space policy announced by the President on July 4th, and is fully consistent with and supports the principles underlying the conduct of the United States space program, including the use of space for peaceful purposes and support of the inherent right, recognized in the U.N. charter, of all nations to self defense. As does the national policy, the DOD policy recognizes those uses of space that have thus far proven sound, while providing the focused direction required to guide future DOD space activities in a changing world environment.

The DOD space policy directs the continued maintenance of a strong technology base, as authorized in the National Aeronautics and Space Act of 1958, with leadership in those areas necessary for effective provision for the defense of the United States. In so doing, the policy recognizes that since a number of military missions can be very effectively supported by space systems, future use of space should have an operational orientation.

Those responsible for DOD space activities are, therefore, directed to provide effective operational support to U.S. forces in peacetime and in conflict. These activities include such functions as command and control, communications, navigation, environmental monitoring, warning, surveillance and space defense.

Soviet development of an operational anti-satellite (ASAT) capability presents the potential for space to become a hostile environment. Therefore, the DOD space policy directs that military space systems, including all essential ground elements as well as orbiting spacecraft, be designed, developed and operated to enhance the survivability and endurance of critical mission functions.

As has been our national policy since 1977, the DOD space policy directs, within such limits imposed by international law, the continued development of an operational, non-nuclear anti-satellite (ASAT) capability. The purpose of the ASAT capability is to deter threats to space systems of the United States and its allies and threats from space systems supporting hostile military forces. Our ASAT development program, contrary to another misconception, has never been a "bargaining chip" for arms control. The Department of Defense conducts research and planning efforts to support the national security interests of the United States by developing those military capabilities required to respond to threats to the national security.

I would like to emphasize that DOD will continue to adhere to the existing international legal regime which pertains to space. The DOD space policy also provides guidance to the department to consider verifiable and equitable arms control measures that would ban or otherwise limit the deployment of specific weapons systems should those measures be compatible with United States National Security.

DOD space policy does not mandate new directions in space weaponry. Yet, at the same time, given the alarming rate of Soviet spending for space activities, it would be imprudent for us not to be prepared to defend our interests there, as anywhere else. As such, we are conducting research and planning related to

space weaponry, but I emphasize that no commitment has been made to acquire space-based weapons. And, we will proceed only if our national security is so threatened.

With this preface, I will comment on space weapon programs in a few minutes, but I would now like to commence with some specifics regarding U.S. space activities, beginning with the space transportation and command and control.

SPACE TRANSPORTATION SYSTEM

The successful flights of the space shuttle Columbia over this past year represent truly significant space accomplishments. Never before has a spacecraft demonstrated the capability to fly repeated missions. This historic precedent marks a major event in the exploitation of space. No longer will space be only a place for experiments and operational platforms whose reliability relies exclusively on autonomous systems. The space shuttle provides the key for a sustained presence in space, as a working environment. The capability to deploy, retrieve, service, and repair cooperative satellite platforms is at hand. These capabilities, when coupled with the shuttle's larger volume and payload capabilities, portend a transformation in our use of space.

NASA has taken the lead in shuttle development, as you are aware. We in the DOD have made a strong commitment to exploit the shuttle and its associated technologies in our future space planning. We have accepted responsibility for the development and operation of the shuttle launch site at Vandenberg Air Force Base for polar orbiting missions, for the development and production of the inertial upper stage (IUS) for use on both civil and DOD space missions, and the development of a number of shuttle related operational capabilities which will enable the DOD to exploit fully the shuttle. We look forward to the routine operational availability of shuttle to enable full consideration of its unique capabilities to enhance our space operations. At the same time, we have no intention of making the shuttle a military vehicle or weapons platform.

Both NASA and the DOD are investigating launch vehicle concepts to supplement the shuttle as our primary launch vehicle. One concept under consideration is the so-called "big dumb booster", or SRB–X, that uses one or three solid rocket boosters, plus upper stages, to orbit up to 100,000 pounds. Another concept is the "in-line launcher concept that uses a module with one or two main engines placed under the shuttle external tank and a large cargo placed atop the tank. These concepts are of interest because they would permit operation of a mixed fleet of space launchers that would make broader use of shuttle systems, but not always require the shuttle orbiters which may not be able to meet all future demands for space transportation.

The Air Force is studying several vehicle concepts. New concepts and advanced technology designs will be studied under a program called the advanced military spaceflight capability. Primarily, we are looking toward a vehicle that could provide a significant increase in unique military capabilities including survivability. Emphasis is being given to such requirements as on-demand launch, use of conventional airfields, military mission capability, etc. The Air Force has initiated an effort to identify requirements, to determine what systems will be necessary, and to pinpoint specific technology which will be needed to support development of these systems.

As the military use of space becomes more essential, the requirement for a more responsive launch capability has become more critical. Quick reaction launch, survivable launch, and reusable aero-dynamic space vehicles are examples of concepts which have been proposed to meet this need. Our proposed effort for the advanced military spaceflight capability (AMSC) programs includes research in those technologies which are critical to, and common to, the various AMSC vehicle concepts.

We also believe that the Nation needs an additional capability to complement the IUS capabilities and provide us an available option for higher performance in the future. We are working with NASA to determine what next generation upper stage will satisfy joint U.S. user needs.

We are also continuing work on the new Consolidated Space Operations Center (CSOC). CSOC combines two major space missions for DOD: Satellite control and space shuttle flight planning, readiness and command/control. In the role of satellite control, CSOC will enhance our operational capabilities by providing greater capability and survivability. The satellite test center and

CSOC will provide mutual emergency backup for mission essential functions should outages occur at either center. In its other role, CSOC will directly control DOD shuttle missions and enhance protection of associated national security information. Design of the satellite and shuttle control systems is underway and construction is planned to start in 1983. Satellite operations are expected to commence in late 1986 with CSOC functioning as an integral part of our worldwide satellite control network. Shuttle missions will be controlled from the CSOC starting in late 1987.

SPACE WEAPONS

The increasing capabilities of military space systems and the operating forces reliance on them mark military satellites as attractive targets and underscores the importance of free access to space for our national systems. The Soviet Union's deployment of an operational antisatellite system demonstrates their understanding of that situation and provides additional rationale for DOD consideration of the role of space weapons. We must develop the means to deter an enemy from using antisatellite weapons against our military satellites. Furthermore, if deterrence fails, we must be able to protect our satellites.

As I mentioned previously, we are currently developing an antisatellite system. This system is comprised of an F–15 aircraft, a SRAM/ALTAIR booster and a miniature vehicle with a non-nuclear warhead. We believe this system has significant deterrence potential and the appropriate capability to meet the Soviet threat to our ground, sea and aerospace forces. Nevertheless, I should mention that some published projections that it could "sweep the skies of 100 to 200 Soviet satellites in a 24-hour period" are vastly exaggerated.

With regard to space laser weapons, DOD conducted a major review of the potential of space-based laser weapons, documented in a 15 May 1981 report to the Congress. We concluded that space-based lasers offer possible military potential in a number of applications, but there are areas of major uncertainty in our ability to predict with confidence their ultimate utility.

Our plan to address these uncertainties was forwarded to Congress this past summer. The planned program is consistent with the report, and is designed to permit an informed decision in fiscal year 1987 on the military utility, cost effectiveness, and development prospects for near term (1990s) space-based chemical laser weapons. It includes Air Force efforts to address overall system and utility issues, to include survivability, total system architecture (e.g., surveillance, command and control), and the Soviet ability to harden potential targets. It also includes plans to pursue development of technology for short wavelength lasers, which are less mature than chemical lasers, but show promising advantages which may be realizable further in the future. However, the House Armed Services Committee recently took issue with our plan, and the authorization conference deleted the requested funds for the Air Force effort. We are therefore currently considering necessary changes to our program plan.

Space-Based Laser Communications

A joint DARPA/Navy submarine laser communications program is developing the technology to communicate from space to submarines at operational depths, with minimal impact on their natural covertness and flexibility. A space-based system might provide for global coverage, survivability, and flexibility in both tactical and strategic operations. The program is investigating systems concepts and advancing device and optics technology for such communications.

Satellite Communications

With regard to other specific satellite missions, I would like to begin with our military satellite communication systems, or MILSATCOMS. These systems are composed of elements supporting strategic, tactical and long-haul communication users. We spent 18 months on a joint effort, with all the services and agencies involved, to define a new MILSATCOM architecture. This architecture relates combat and combat support needs to near, mid, and far term MILSATCOM systems in the presence of the ever growing Soviet threat. The heart of the architecture is MILSTAR, a new, highly survivable and enduring system. It will provide high capacity, worldwide, jam-resistant communications for our strategic and tactical forces. Principal users of MILSTAR will be the strategic nuclear-capable forces, the Navy, and tactical ground mobile forces of the Army, the Marine Corps, and the Air Force.

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Planning for the baseline MILSTAR constellation includes five geosynchronous satellites (four operational and one spare) and three polar-orbit satellites. The seven operational MILSTAR satellites will provide communications service to all areas of the Earth exclusive of the South Polar region. UHF channels will be used to ease transition and provide continuity of service with terminals now serving strategic and selected tactical forces. Tne UHF channels will be interconnected with the EHF channels to enable consolidation of all MILSTAR crosslink and downlink information.

The terminal segment of the MILSTAR system consists of terminals located on aircraft, ships, submarines, jeeps, armored track vehicles, and at fixed terrestrial sites.

MILSTAR design will incorporate both electronic and physical survivability features to counter jamming and ASAT threats postulated for the 1980's and 1990's. The system definition and design phase is expected to conclude next month.

Currently, we also hope to acquire three additional fleet satellite communication satellites, or FLTSATCOM, to avoid a strategic communications gap until the MILSTAR system is sufficiently operational. FLTSATCOM is a UHF satellite communications system which significantly improves naval communications to meet the needs of the fleet in the 1980's. The system consists of four geostationary satellites now on orbit which provide virtually worldwide coverage for fleet operations. All ships are now equipped to receive the FLTSATCOM fleet broadcast and more than 340 vessels have a transmit capability.

In response to congressional direction, DOD issued a contract in October 1978 for a Leased Satellite System (LEASAT) to follow the FLTSATCOM program in supporting our tactical users and general purpose mobile users. Four operational satellites are planned to provide worldwide leased UHF satellite service. System operations are linked to the space shuttle schedule since the spacecraft configuration is incompatible with expendable launch vehicle dimensional constraints. The capacity of the Leased Satellite System is substantially less than that of FLTSATCOM and has no jam resistance. The reduced capacity was necessary in order to provide a simple satellite design that could be obtained by leasing. LEASAT service will begin in 1984 and could extend into the 1990's.

Another operational program is the air force satellite communication system, or AFSATCOM. It was conceived as an evolutionary SATCOM system to provide the national command authorities (NCA) and CINCS with worldwide secure, survivable communications for command and control of the nuclear capable forces. It provides essentially worldwide coverage with modest antijam capability. The space segment consists of transponders on polar-orbiting satellite data system satellites, geostationary FLTSATCOM satellites and other host satellites, in conjunction with a family of Earth-based terminals. The system handles messages for emergency action message dissemination, NCA/CINC internetting, force direction, and force reportback. While AFSATCOM represents a significant increase in capability insofar as connectivity, coverage and reliability are concerned, an increasing threat dictates elimination of the vulnerabilities in the current system. The MILSTAR program will overcome those vulnerabilities projected into the next century.

Finally, DOD maintains the defense satellite communication system (DSCS). It is a high capacity, super-high frequency (SHF) system to satisfy the unique and vital national security communications requirements for worldwide military command and control, and crisis management. The DSCS supports telecommunications needs of the worldwide military command and control system (WWMCCS), the national command authorities (NCA), the ground mobile forces (GMF), the diplomatic telecommunications system (DTS), the defense communications system (DCS), and selected allies.

I also want to mention that NASA communications satellite efforts, although being developed for a very different mission, have frequencies in the same band as the MILSATCOM system. For that reason, the DOD does have some joint activity with NASA. For example, we are currently sharing the development of some transmitting devices. The DOD will continue to pursue joint projects with NASA where it is the best interest of both organizations to do so.

Meteorology

Another important military satellite capability is contained in the defense meteorological satellite program (DMSP) which supports DOD needs for

weather information. Defense requirements call for two satellites continuously in orbit, obtaining weather information from all points on the Earth at least four times each day.

Navigation

For navigation, the DOD is continuing the development of the NAVSTAR global positioning system (GPS) to satisfy the military need for information on the location of force elements. NAVSTAR GPS will provide users with precise position information on a 24-hour, global basis under all weather and visibility conditions. This capability will significantly enhance the mission effectiveness of all U.S. military forces. In addition to its function of improving United States and allied military forces' weapon delivery and target destruction capabilities, GPS has the potential to provide unique positioning and navigation services to civil and commercial interests on a worldwide basis. GPS satellites will also play another extremely vital defense role by carrying the integrated operational nuclear detection system (IONDS) payloads. IONDS will provide real-time strike and damage assessment information, thereby enhancing strategic force management.

Ocean surface surveillance and targeting

Continuing evaluation of the threat and fleet operations has shown that none of the Navy's operational surveillance systems provides the full range and depth of information required by tactical commanders. Accordingly, a detailed assessment of needs and system alternatives was undertaken, leading to initiation of concept exploration studies for the integrated tactical surveillance system (ITSS). ITSS, as an evolving system, will be built on several existing programs. In those cases where existing capabilities are found to be deficient, upgrades and/or new system developments will be initiated. Upgrades will provide near-term system improvements while needed new capabilities are under development.

Strategic Defense Systems

The Defense Support Program (DSP) is one of the key elements of the U.S. defense posture. The system uses satellites at synchronous orbit. In FY 1982 we initiated the procurement of long lead items for additional satellites to maintain the space segment.

Another key element which falls into the overall defense posture area is the Air Force development of the Integrated Operational Nuclear Detection System (IONDS), which I mentioned earlier as projected to fly aboard the NAVSTAR GPS system. IONDS will also be capable of detecting, locating and reporting, in near-real-time, nuclear detonations on a global basis.

SUPPORTING SCIENCE AND TECHNOLOGY

In addition to the systems I have covered, DOD is investigating a wide range of space technologies to maintain our present lead over the Soviets in selected areas. Several programs related to missile surveillance technology are developing sensors and collecting background data for application of infrared (IR) technology to surveillance and warning missions. Development of surveillance technology for infrared mosaic detector arrays, onboard signal processing, cryogenic refrigerators, large optics, and structures is continuing. A new generation of detector arrays, physically integrated with pre-processing electronics in a planar configuration, has been tested. Advanced microwave technology on miniature, low cost radar transceiver modules using integrated circuit technology is being pursued. Low cost, light weight and high efficiency of the modules are key factors in feasibility for use in space-borne radars, as well as a variety of other phased array radar and communication applications in airborne and surface systems.

MANAGEMENT OF SPACE PROGRAMS

Centralizing the management of space activities within the DOD has been discussed for some time. Our organization for space has been evolving fairly rapidly over the past few years. Within the Office of the Secretary of Defense, we have established the defense space operations committee. In my office, I have asked Dr. Cooper to act as the principal focus for review of space research and development across all mission areas. The Air Force has established a space operations

steering committee; formed a new directorate of space within the Deputy Chief of Staff, Plans and Operations at Headquarters Air Force, and has designated the Deputy Commander for Space Operations at Space Division in Los Angeles. These organizational changes were made to sharpen our focus for space activities and bring increased management attention to this important area.

As you are aware, the Air Force has also established a space command in Colorado Springs. Again, the centralization of operational activities within this command should not be perceived as a move toward the militarization of space, but rather for its intended purpose as supported by the Congress. That purpose is to consolidate Air Force operational space activities and provide a link between the space-related research and development process and operational users. This new command (not an elevation of space division) will bring about management and resource efficiencies through consolidation of requirements, comparison of alternatives to satisfy those requirements, integrated long range planning, enhanced technology transfer and reduced duplication of effort. Our view is that this move will substantially contribute to deterrence, and thus international stability, by reducing uncertainty. As our dependence on space grows, space command also offers an excellent foundation for a DOD organization to monitor our resource commitments and review our space policies to ensure the strength of our national security.

In closing, I believe we must be constantly aware of the appropriate and best technological course for our military space systems, both in terms of mission and cost. The pre-eminence of U.S. technology has been, and will continue to be, a cornerstone of our space program. We must continue maintaining that pre-eminence and building a technological base that will allow us to conduct effectively more diverse space operations in the future. To do this, we in the executive branch must work with the Congress to make certain that our national technological operations remain unchallenged. I, therefore, encourage your full support for our military space programs.

Senator PRESSLER. Well, thank you.

I noted that you said it was a misconception that the Defense Department was trying to get into an arms race in outer space or something to that effect. Indeed, while I am not questioning the motives of the Defense Department, the statistics I cited indicated that we are getting into a weapons competition in outer space.

You also mentioned that we are not violating any international law. That is the very point I'm trying to make, we need some international law. We potentially need to move toward an agreement or a treaty in this area. As far as I know, there is very little accepted international law or treaties concerning how many antisatellite devices or how many lasers or how much military hardware can be deployed in outer space.

This could also have a great impact on communications and on the quality of life in general. We are depending increasingly on satellite communications in activities ranging all the way from news reporting to entertainment. Indeed, cable TV is being supplemented by direct satellite broadcasting, and so forth. So, there are many interests besides those of the military involved here.

My point is that we do not have enough international law governing all space objects. Unless we negotiate such agreements, we are going to be facing a real problem, not only from a military point of view but also from the point of view of the danger posed by civilian satellite congestion, for instance.

So, let me say at the beginning, we are not violating any international law by deploying space weapons, because there is not enough international law in this area. There is some, but too little in my view.

Is it a misconception that the space race is accelerating?

Dr. DeLauer. The misconception, Mr. Chairman, is really the misconception that is carried by indicating that with the increased investment we are making in space assets, that it is all going toward investments in what you might call the militarization, as opposed investment in things that are necessary for us to be defensive—our surveillance systems, our communications systems.

When you look at the breakdown of the investment that we have forecasted, you will find that a very small percentage of it is going toward an ASAT. Most of it is going toward communications and other surveillance activities. So, that is the misconception that I wanted to correct, that just because the budgetary aspects are increasing it does not necessarily mean that more and more effort is being redirected from what we have done in the past.

As a matter of fact, with these new satellite systems, particularly in the communications area, a tremendous amount of effort and money is being spent on ground terminals. And as a matter of fact, if you look at the civilian systems you will find much more money is going to be spent on ground terminals than will ever be spent on airborne systems and space-born systems. Using your own example, in the future we will be getting all of our news, TV, all this sort of thing, with direct broadcast satellites.

The amount of money being invested in the space segment is insignificant to the amount that will be invested on terrestrial equipment, and that is the same with us in the military. So, do not look just at the budgetary increases and make the assessment that we are started on a very, very big race.

Senator Pressler. Well, that is true, but we are spending money on killer satellites, for example, today, whereas we spent none before. Is that not correct?

Dr. DeLauer. What do you mean by a killer satellite?

Senator Pressler. Well, for example, the F–15-based ASAT system. What potential value do you feel this system has?

Dr. DeLauer. Well, that is an antisatellite system. That is not a killer satellite.

Senator Pressler. What is the difference between an antisatellite and a killer satellite?

Dr. DeLauer. That was something you stated. I do not know what you mean by killer satellite.

Senator Pressler. I am giving you an example, the F–15-based ASAT system. I assume it would have the capability of killing or making inoperable or destroying.

Dr. DeLauer. A satellite?

Senator Pressler. A satellite. So, that is what I would call a killer satellite. What confidence do you have in the potential value of the F–15-based ASAT system? We are building that, is that correct?

Dr. DeLauer. That is right.

Senator Pressler. We were not building that before, were we?

Dr. DeLauer. We have been studying it for years.

Senator Pressler. But we are starting to build it. The point I am making is that it is not a misconception that we are entering into a very costly competition. Perhaps we are already in it. I think it is a

great mistake not to acknowledge what is happening in terms of the budget and the shifts that are occurring in the Air Force. They have created a Space Command.

But the point is, this is the first time I have ever heard anyone say it is a misconception that we are getting into a very costly arms race in space. Certainly, the F–15-based ASAT system would be a part of that.

Dr. DeLauer. That is part of it, but we have been working on that since 1960.

Senator Pressler. We are building it now, are we not?

Dr. DeLauer. We are building it.

Senator Pressler. What is your point? I do not understand what your point is?

Dr. DeLauer. The point is, Mr. Chairman, in your opening remarks you make a characterization—by giving the total amount of money being applied to the space activities of the Department of Defense—and gave the implication it was all going toward the space race. There are programs that are being funded, and that is true. But the bulk of the money is going to support nonantisatellite activities, and that is the point I wanted to make absolutely clear.

Senator Pressler. Yes; but the increase is there. The pattern is shifting. And I have presented some statistics, as a matter of fact, that were run in a Jack Anderson column in August.

But in any event, what is your view of the F–15-based ASAT system? What confidence do you have in its potential value?

Dr. DeLauer. I think it is the basis for our antisatellite capability, and everything that we have done to increase our capability has always seemed to be very useful when we sit down and talk to the Soviets about these general matters.

Senator Pressler. So, this, whether I call it a killer satellite or you call it an ASAT system, will this new system that we are building, will that in effect leapfrog the Soviet Union's antisatellite program? Will this move us ahead of the Soviets when this weapon is deployed?

Dr. DeLauer. No; I think it will give us a capability they now have.

Senator Pressler. So, the potential for war in space will be equal at that point, more or less.

Dr. DeLauer. You said that, Mr. Chairman, not me.

Senator Pressler. Well, what would you say?

Dr. DeLauer. I would say just what I said. It will provide us a capability that we do not now have and they do, and that is what it will be.

Senator Pressler. But who will be ahead?

Dr. DeLauer. I do not think it is a question of who is ahead or who is behind. It is their capability.

Senator Pressler. That is my question.

Dr. DeLauer. Ahead or behind happens to depend on what you do next.

Senator Pressler. But right now the Congress has been told that the Soviets are ahead of us in building what we call killer satellites or ASAT systems. Therefore, we were supposed to come up with the money for the F–15-based ASAT system, which we have been doing research on for a long time and so forth.

Dr. DeLauer. That is correct.

Senator Pressler. We are building it because we feel the Soviets have a better capability today?

Dr. DeLauer. That is right.

Senator Pressler. They have a better capability today?

Dr. DeLauer. That is right.

Senator Pressler. And this will give us a better capability or a capability.

Dr. DeLauer. A capability.

Senator Pressler. In your judgment, speaking for the Defense Department, will that capability be as good as the Soviet's?

Dr. DeLauer. In some respects, yes; in some respects, no.

Senator Pressler. In what respects yes and in what respects no?

Dr. DeLauer. They have done 10 years of testing which we will not have done, and testing implies a certain amount of confidence in the system as well as its capability.

Senator Pressler. Will we then anticipate that the Soviets will build a better system at that point, and we will have to go on to the next step, or will this be the end of it? What would you, in your professional judgment, say would happen next?

Dr. DeLauer. I think that based on the past as a prelude to the future, I would say that the Soviets, with their investment, particularly in other activities in charged-particle types of weapons, I think they may continue a program that would be beyond us. But that is a supposition.

All you can do, based on that, is review what they have done in the past and predicting what they might do in the future. They have never reduced their spending in this area.

Senator Pressler. Are we more dependent than the Soviets on satellites for nonmilitary and nonintelligence purposes?

Dr. DeLauer. In some areas we are and in some we are not.

Senator Pressler. What areas are we and what areas are we not?

Dr. DeLauer. We are much more dependent than the Soviets on communications satellites. I think they are much more dependent on things that have to do with targeting.

Senator Pressler. You said the F–15 ASAT program was initiated in 1960. I believe that the decision to develop the system was taken in 1977.

Dr. DeLauer. We worked on an ASAT program starting in 1960.

Senator Pressler. So, that the development of the F–15 based ASAT was initiated in 1977?

Dr. DeLauer. A program like that was initiated really before. When you looked at some of the subsystems that have gone into it they have been being worked on for almost a decade and a half.

Senator Pressler. Now, I do not know whether we have a disagreement here or not, but your statement made no assessment of the size of the budget going to military space weapons programs. You only stated that such activities are increasing.

What could you tell us about size of the budget going for military space weapons activities? Are the figures that I had here earlier, were they correct, or what figures would you give for the current cost of military space war activities?

Dr. DeLauer. Well, that is the point. It is military space. I do not put the words "war activities." You are attempting to make a distinction between the budget we have for military applications, such as communications satellites, surveillance satellites, navigation satellites, weather satellites. I consider those military applications and they are included in the budget.

Senator Pressler. Well, for example, I understand the budget of the Air Force's Space Command, co-located at Colorado Springs with the North American Defense Command, will increase from $2.9 billion in fiscal year 1982 to $4 billion in fiscal year 1983. Would that be accurate?

Dr. DeLauer. It could be, but it does not necessarily mean that it is anything more than an upgrading of the computers in the mountain. It is providing an investment into what we call the CSOC, which is a control facility for both satellites and military operations of the shuttle. All of those things go into that particular budget item.

Senator Pressler. So, in other words your bottom line is that there is not so much to worry about and that we are not increasing spending on space weapons. So, next year, when you are up here for appropriations and when I am voting on the military budget, I will not have to consider increases in this area. Is that the Defense Department's position?

Dr. DeLauer. No; that is not our position. I was just trying to point this out as an area that has been misconceived as being devoted to a particular segment of the military space budget. It is not. That is all I am trying to do.

Senator Pressler. Maybe we are going in circles here, but of all the statistics that I have—and I could leave it open for the record and submit more of them—I think we have an alarming increase in spending in outer space weapons by both sides and I wish we could find a way to stop it.

Do you think there is any way we could enter into an agreement with the Russians in this area?

Dr. DeLauer. Now, you are out of my pay grade, Mr. Chairman. You heard from Gene Rostow. I think his statement is a better indication in answer to that question than mine.

Senator Pressler. Do you believe that either side could develop operational space-based directed energy weapons systems in the near future?

Dr. DeLauer. I think that it is possible to develop them. I think it is a question—I will take Senator Percy's stance—the word "near" might be different in some people's mind than others. So, I would say that probably not in near, no.

Senator Pressler. In recent months, increased attention has been given to the development of a space-based missile defense system. Proponents claim that such a capability could be developed using current technology and such a capability would be well within U.S. budgetary constraints. What is your option regarding these claims? Do you believe that a space-based missile defense is a desirable addition to the U.S. military posture?

Dr. DeLauer. I assume you are referring to the proposals being made by a group called High Frontier. Is that the one?

Senator PRESSLER. Yes; I have seen them on TV and I have read their publications. How realistic is their proposal?

Dr. DELAUER. If I can respond to that particular proposal——

Senator PRESSLER. OK, go ahead.

Dr. DELAUER. They have a certain basis technically of being able to postulate that they could develop a system. Two weaknesses, as far as I am concerned, are the time it would take and the amount of money that it would take. I think they are both grossly underestimated.

Senator PRESSLER. So in other words, your bottom line is that you do not anticipate us getting into that kind of a race, involving a space-based missile defense system?

Dr. DELAUER. Not at this time, no.

Senator PRESSLER. It is not in the planning? It is not being seriously considered—this High Frontier concept? Are there no groups in the Pentagon who have plans to deploy such a system?

Dr. DELAUER. No, there is no group that has that plan. Dr. Cooper on my left is Director of Advanced Research Projects Agency [ARPA], which does most of our advanced activity. Why don't you ask him the question?

Senator PRESSLER. OK. Does the Advanced Research Projects Agency have any plans for a space-based missile defense in the making?

Dr. COOPER. No, sir. As a matter of fact, I think there could be one other reason added to Dr. DeLauer's other two reasons why it is unlikely that anyone could do that in the near term. The enormous complexity of such a system is unmanageable today, in our judgment, and we need basic, I would call them, breakthroughs in the ability to manage large complex systems before any such system might be feasible in the future.

Now that is not to say that we are not working on these problems vigorously in our research programs. It is incumbent upon us, as people given the responsibility to deal with future threats, to work on these very tough, very difficult, very complex problems, and so we are working on the complex management issue in some considerable detail.

Senator PRESSLER. Do you believe the Soviet Union has sufficient resources to conduct a race with the United States in the development of space-based weapons? The Soviets do have severe economic problems.

Dr. DELAUER. My answer is yes. If they want to divert resources to that area, yes, they can do it.

Senator PRESSLER. What kind of projects is the Advanced Research Projects Agency—I know the agency because when I was in the Army I was loaned to ARPA for a project for a while in Vietnam many years ago, but I have not kept up since then. What type of programs are you conducting in this area?

Dr. COOPER. ARPA's charter is to look to the more distant future and to take high risk, high payoff investments in the research and exploratory development area that could enhance our ability to meet threats, military threats, in the future, and we are doing a number of things in this area to prepare in the future if the contingency does come about, that we will be able to meet threats of substantial magnitude in space in the future.

We have broad programs in advanced surveillance technology—surveillance being one of the more stabilizing influences that space can have on warfare on the surface of the earth. We do exploratory development on a wide variety of space radar-type technologies and laser technologies and others as well.

So we are reaching off into the more distant future—10 years and beyond.

Senator PRESSLER. All right. Let us go forward 10 years. How do you envisage the arms race in space 10 years from now? Just give us a small look into the future—play Herman Kahn for a moment.

Dr. DELAUER. I do not believe there is an arms race in space, per se. I think there are interests, national interests in space which are growing, by and large. Now those interests are in surveillance systems and communications systems and, for the Soviet Union, on some targeting systems that they have. We have navigation systems, weather satellite systems that represent military interests in space, and all of these systems are meant to support activities on the surface of the earth and to provide the National Command Authorities with the information that they need to make stabilizing judgments on military actions that may be required.

All of these things we view as national security interests that must be protected. They are expanding, but they are not militarization of space in the sense of placing weapons into space that can be used in direct action. We have no plans to do that, but we are working on research that could enable that in the future if national security interests demanded it, and I think that we must do that.

Without doing that, we really place the nation in some potential jeopardy in the 1990's time period from threats that could materialize there.

Senator PRESSLER. We have a basic disagreement. You claim in your statement that you do not feel—I do not remember your exact words—that we are in an arms race in outer space, and that seems to be the position of the Pentagon.

I could not disagree more strongly. I think we are not only on the threshold of an arms race in outer space, but are crossing it. The statistics I cited in my opening statement on the various areas where there is a dramatic upswing in activity I think illustrate that. So I guess the purpose of this hearing might be twofold.

One is to try to get to the bottom of it. Are we entering an arms race in outer space? And, two, if so, why can't we stop it? But let us deal with that first question.

Now you stated you did not think we were in an arms race in outer space and 10 years from now you feel that we will be in one.

Dr. COOPER. No.

Senator PRESSLER. No, you did not? Why are we building an ASAT system?

Dr. COOPER. I believe that our national interest in space will continue to expand and I believe that the Soviet national interest and other countries national interest in space will expand. Just take, for example, the investments that we have in commercial communications satellites. It is expanding at the rate of well over $1 billion a year now and our national interests in those systems in space will continue to grow.

Wherever the country has national interests, it is going to have national security interests. That is all I was saying. I believe those will continue.

Senator PRESSLER. The two are tied together and you are right. We are increasing our commercial use of space. I serve also on the Communications Subcommittee in the Commerce Committee and the expansion of satellite communications and the level at which we are launching them is just amazing. We are going to have a lot of assets orbiting in space. We already do.

This provides the incentive for an enemy to knock satellites down and to build an anti-satellite system or killer satellite system—whatever you want to call it. With the items I have cited in terms of creating a Space Command, in terms of increasing the budget in this area by not millions but billions, how can you say that we are not in an arms race in outer space right now?

Dr. COOPER. Because we are not placing arms in space. We are placing objects in space that protect our national interest there and protect our national interest on the ground.

Senator PRESSLER. Well, how is that different? I know, of course, we are not putting machine guns up there.

Dr. COOPER. Weapons.

Senator PRESSLER. But anti-satellites or lasers, killer satellites or whatever, those are the weapons of outer space and we are developing that, are we not? The ASAT F–15 program, isn't that part of the arms race? It is part of the Pentagon's budget.

Dr. COOPER. No, I do not view it that way. I guess my view is that is an attempt for this country to protect its national security interests.

Senator PRESSLER. But isn't that part of national defense?

Dr. COOPER. Yes.

Senator PRESSLER. So maybe it is not an arms race, but it certainly represents increased defense spending. I think we agree here, but disagree semantically.

Let me say I believe that we are in a very costly arms race in outer space. Based on what specialists have told me in meetings, in 10 years we would be spending almost as much on the arms race in outer space as we are on the ground. It is going to be enormously expensive and it does not appear that there is going to be any reduction in the cost of the arms race on the ground. Our military budget could expand enormously and it will be hard to argue against it given the unconstrained military developments of the Soviet Union.

I think we should nip it in the bud now, so to speak. But you do not foresee that happening?

Dr. COOPER. No.

Senator PRESSLER. How much do you think we will be spending on ASAT systems in 10 years, as compared to now? Do you think the F–15 ASAT will be the end of it?

Dr. COOPER. I suspect that the system will be operational within 10 years and that we will be spending O&M funds on that system.

Senator PRESSLER. Operation and maintenance. You mean after it is built we can sit back and that is the end of it—no more lasers, no more killer satellites? The Pentagon is not going to come up here and ask

me to vote for more money. What about the proposition that if one is to control ASAT, one must do that before weapons are operational?

Dr. COOPER. Mr. Chairman, we have no plans to do anything beyond the current ASAT program.

Senator PRESSLER. What about lasers?

Dr. DELAUER. We have laser programs.

Dr. COOPER. We have research and exploratory development programs that will open up options for us for the future, but whether or not those options are exercised will depend on the then-current assessment of the national security interests in space, and there is no reason to believe that our national security interests at that time would require that we use any of this technology.

Senator PRESSLER. That is the best news I have heard for a long time. I hope you are right. In other words, what you are saying is very startling. You are saying that we are not entering into an arms race in outer space, that if I am still around here in 3 or 4 years I can say that you told me I did not have to vote for any additional funds for some new program or a laser system and a new ASAT.

Dr. COOPER. Now wait; that is not what I said. That is what you said.

Dr. DELAUER. That is what you said, Mr. Chairman, not us.

Senator PRESSLER. Secretary DeLauer, why don't you state the Pentagon's position? Are we in an arms race in outer space?

Dr. DELAUER. Not in the way that we define an arms race.

Senator PRESSLER. That is incredible to hear you say that. How do you define an arms race?

Dr. DELAUER. I define it as a situation where we have a capability and we are going to increase that capability beyond the necessary capability to support our interests. I just do not think that is the case in the antisatellite areas.

Senator PRESSLER. What about the F–15-based ASAT system?

Dr. DELAUER. That is not a race at all. We have not even got off the ground, so we are not racing anybody. We are trying to get a capability that will permit us to have somewhat the same capability the Soviets have had for 10 years.

Senator PRESSLER. That is the equivalent of saying that we are building this missile because the Soviets have one already. And we say they have an anti-satellite system so, therefore, we are building one. I do not see the distinction.

Dr. DELAUER. Mr. Chairman, if you are going to call it an arms race, there is nothing I can do, sitting down here as a witness, except sit here. I think it is a semantic difference and we have to let it go at that.

Senator PRESSLER. Based on what I have seen in terms of the money going over to the Pentagon, we are in an arms race. Call it what you want, but we are spending dramatically increased funds. Maybe we have to, but the point is I would like to see that stopped.

Maybe we are just proceeding circuitously here, but let me just state to you very clearly that at least one Senator believes we are at the start of something that will be one of the most expensive ventures in mankind's history—the arms race in outer space. I hope I am wrong and I hope you are right, but I think we are going to find that to be

very expensive and I think the ASAT—the F–15 ASAT system—is just the beginning. I believe that the Pentagon is going to be up here every year from now on asking for billions of dollars to increase it.

I hope I am wrong.

Dr. DeLauer. So do I.

Senator Pressler. Good.

I did want to ask you the one question that I asked Dr. Rostow, which he kindly said that you could answer, and that involves the MX system.

We are switching gears a little to the Threshold Test Ban and Peaceful Nuclear Explosion Treaties and I have prepared remarks on that,[1] so if staff, with unanimous consent, would place this statement near my earlier remarks.

Press reports indicate the Defense Department would like to proceed with DENSEPACK basing of the MX missile. Do you believe that the resumption of high yield tests by the Soviets would allow them to perfect the kind of high yield weapons that would defeat the MX survivability which was claimed for DENSEPACK?

Dr. DeLauer. Just to make it clear, that was a newspaper report that the Defense is recommending that particular basing scheme. No decision has come out of the Secretary's office to the White House on what the MX basing mode will be. We are still under study.

So we just take the question, then, of whether or not the Soviets have to resume high yield testing in order to carry out their development program that could indeed negate superhard structures.

My view is that no, I do not think they have to have high yield experiments in order to ascertain whether or not they have a design capability that can go after a very hard structure. I think they have to do a lot of testing, but not necessarily of high yield above the present threshold. I think they can do it well within the present threshold.

Senator Pressler. I have one final question along the lines of what the Pentagon is planning, what it foresees. There have been reports that thought is being given to developing a military strategy for space, an overall strategy from a military point of view. Is that correct?

Dr. DeLauer. Why don't I have Dr. Lehman respond. He is from OSD Policy and is responsible for putting together the defense guidance, where you would hope that the strategic concerns of the Defense Department would be contained. So let me give him a little time since he spent all morning over here.

Senator Pressler. Well, there are so many Lehmans in government, so this must be——

Dr. DeLauer. Well, this is the same name, but a different family.

Senator Pressler. All right.

Dr. Lehman. Thank you, Mr. Chairman.

In conjunction with the President's review of his overall space policy, the Department of Defense itself reviewed space policy. Our findings are not any different from what the President has already announced. That is to say that we understand the value of space for the well-being and prosperity of not only our people but the peoples of the world.

[1] See p. 21.

Our policy is not new in the sense of any fancy space policy that one might imagine. We are committed to guaranteeing free access to space for ourselves for peaceful purposes and we also understand the importance of, for example, an ASAT system to deterrence.

I might note that with respect to an ASAT system, it has a certain deterrent value in and of its own in several ways. One is it tends to deter Soviet use of an ASAT system. Second, because of its capability against certain systems in space which the Soviet Union itself finds valuable, it helps deter war because what it says to them is that they cannot be confident of orchestrating any attacks and aggression, as there is an important, shall I say, deterrent aspect and peace-promoting aspect even to an ASAT system.

You have talked a little bit about the high cost of space hardware. Indeed, all high technology is high cost. I would like to just add, if I could, a couple of remarks on that. Some of the most expensive systems in space are systems that we find extremely valuable; for example, for verification of arms control agreements.

Some of the most expensive systems in space are systems which are valuable to us in a confidence-building way. That is to say, they let us know whether we are under attack. They help us know whether or not we have false alarms. Those systems we rely on heavily to reduce the risks of accidental war and I should point out that unfortunately they are not cheap.

Thank you, Mr. Chairman.

Senator PRESSLER. So you would disagree. What I gather from the earlier comments is that we in Congress should not be too concerned about weapons in space. The Pentagon's message is that I am wrong in being concerned about this at this time; and that we are not into a race and perhaps risking a war in outer space; and, that, indeed, next year when we have the military appropriations debate I am going to quote you fellows if there is a request. May I do that?

Dr. DELAUER. Mr. Chairman, you said that. I did not say that.

Senator PRESSLER. What did you say?

Dr. DELAUER. We said we felt we had a balanced program, one that was conceived on solid technology before we implemented it, one that took into account our security interests, which represented essentially the assessment of the adversary's capability, and that when required and when ready, we would propose systems that would protect that security interest. They may indeed be systems that would cost more money and we would have to come to Congress and justify them to you, and I would hope at that time we could.

That is where we came in this morning and that is where we hope to be able to leave this morning.

Senator PRESSLER. Dr. Lehman, you used the terms "extremely costly." What do you envisage? What kind of money are you talking about?

Dr. LEHMAN. I will leave the budget discussion to the budgeteers, but what I am saying is that the cost of a satellite is vastly more expensive than the cost of a rifle, although I might add that the cost of rifles has gone up quite a bit over the last few years also. It is just that these are the facts of modern technology.

But what I was suggesting to you is that when you say there is a war in space, a war is a form of hostilities and aggression. Indeed, international law does cover that. We believe it does cover that in space. We have treaties which ban the placing of weapons of mass destruction into Earth orbit. We have an extensive amount of international law dealing with many things—for example, the ABM Treaty.

I would also say that there are areas where we have sought to go beyond where we are in international law, and we would like to do that.

Senator PRESSLER. The most recent Soviet antisatellite weapons test occurred June 19. This test was one element in a coordinated series of weapons launches, including land and sea-based strategic missiles, an SS–20 theater weapon and experiments involving ballistic missile defenses.

To some analysts, this test sequence suggested that the Soviets view offensive space weapons as a potential ingredient for waging nuclear war. Mr. Lehman, what is your assessment of this, and also the assessment, if the Soviets view this as a way to—I don't know if they're looking at space-based missile defense systems or what, but what is your assessment of that June 19 test by the Soviets?

Dr. LEHMAN. Mr. Chairman, this is an open session and we cannot go into the details of our analysis of that test. On the hardware side, I think Dr. DeLauer would be better qualified. But again, this is an open session.

Let me just say, in general, I think we have long known what the implications are of ASAT systems for deterrence, and it is a two-edged sword. That is to say, clearly, we understand that if the Soviet Union's ASAT system were not deterred by the United States and they had the freedom to attack our warning satellites or our communications satellites, that is destabilizing, because they may very well think that we have become so dependent solely on space assets that a quick attack by a small number of systems might aid them in creating a situation for military victory.

On the other hand, the ability of the United States to retaliate not only deters their use of the ASAT, but also causes them to question whether or not they should believe anyone who tells them they can plan and conduct a surprise attack. So it has a powerful deterrent effect.

Senator PRESSLER. Well, in any event, I would like to conclude this by asking that the Advanced Research Projects Agency, or someone in the Pentagon give a short written statement as to what you project the costs of the space race will be.

Now, here is what I gain from what you've been saying, and maybe I am hearing it wrong. These are my words. I gather that the Pentagon is saying to Congress, do not worry, the expenditures that we are making probably will not be increased, there is nothing unusual or dramatic in the military space program.

But after looking at the problem, I feel that we are stepping into an area that will be enormously expensive, more expensive than anyone has imagined. Congress is going to be told in 3 years, maybe in 5 years from now, that we need to appropriate billions of dollars to offset this race, that this was not foreseen, that developments have come about that require enormous expenditures.

I just sense this occurring. I hope I am wrong. I know ARPA can provide analysis of future developments. Could we have some projections on spending—now, I have given some in my opening statement—submitted for the record as to what you foresee?

Dr. COOPER. Mr. Chairman, since I have been at ARPA I have found that at least ARPA's abilities to project spending are very poor, indeed.

Senator PRESSLER. Well, do what you can.

Dr. COOPER. But we would be happy to reply in some way to your request for information about how much a space war may cost.

Senator PRESSLER. I would like the Pentagon's best view, not just ARPA's. What we expect to spend in the next 5 to 10 years, what you foresee? I gather that beyond ASAT F–15-based system we are not going to be hearing many requests. At least that is what I gather.

Dr. COOPER. There is no plan for that.

Senator PRESSLER. All right, I will remember that.

Thank you very much.

Dr. DELAUER. Thank you, Mr. Chairman.

Senator PRESSLER. Now we have three public witnesses. They are Ambassador Robert Buchheim, former U.S. Ambassador to the antisatellite talks; Dr. Richard Garwin, an IBM fellow at the Thomas J. Watson Research Center; and Dr. John Steinbruner, director of defense studies at the Brookings Institution.

Perhaps since Ambassador Buchheim was a former negotiator in our former talks, he could be first.

[Ambassador Buchheim's biographical data follows:]

BIOGRAPHICAL DATA OF ROBERT W. BUCHHEIM

Robert W. Buchheim, 57, received his Bachelor, Master, and Ph. D. degrees in Electrical Engineering from Yale University. He served in the U.S. Marine Corps, and his professional experience includes having been a project engineer at North American Aviation; Executive Director, R&E, North American Rockwell Corporation; head of the Aero-Astronautics Department and member of the Research Council, The RAND Corporation; USAF Chief Scientist; president, Southwestern Research Corporation; deputy assistant director, U.S. Arms Control and Disarmament Agency (ACDA); a principal figure in the development of the Threshold Test Ban Treaty and PNE Treaty; U.S. Commissioner on the United States-U.S.S.R. Standing Consultative Commission; Ambassador; Head of the U.S. Delegation to United States-Soviet negotiations on anti-satellite systems; member and chairman of many boards and committees; Associate Provost and Professor of Engineering Management, Vanderbilt University. He has received awards from Yale, the Air Force, the Navy, ACDA, and Vanderbilt.

STATEMENT OF HON. ROBERT W. BUCHHEIM, FORMER HEAD OF THE U.S. DELEGATION TO THE UNITED STATES-SOVIET ANTI-SATELLITE WEAPONS TALKS

Ambassador BUCHHEIM. Mr. Chairman, it is gratifying to be invited to appear before you to offer my personal views on arms control as an element of national and international approaches to evolving space activities and potentialities. I will deal with just one portion of this complex matter—the concept of limitations on antisatellite operations and systems.

My views have been influenced by my experience as the head of the U.S. delegation to U.S.-U.S.S.R. negotiations on antisatellite matters,

but I will not discuss those negotiations except as you might have questions about them.

My statement is brief, but is supplemented by a more detailed paper which I have provided for inclusion in the record, if such inclusion is agreeable to you.

Senator PRESSLER. Let me ask you, as the Ambassador who negotiated at these talks, why were the talks broken off in 1979?

Ambassador BUCHHEIM. Mr. Chairman, would it be agreeable to you, in addition to adding my long supplementary statement for the record, to let me finish this short statement, and then I will answer your question?

Senator PRESSLER. Yes, indeed.

Ambassador BUCHHEIM. It is my general view that one cannot be for or against an agreement limiting antisatellite activities or assets in the abstract. Whether or not an agreement is in our interest depends upon its specific provisions and implementation requirements.

It is further my view that we should adopt, initially in our own councils, an experimental or exploratory approach, in which we postulate possible agreements of various substantive form and scope and thrash out clear conclusions as to desirability or undesirability; and if and when such homework carries us to a conclusion that we are ready to move this process beyond our own councils, we ought to ask the U.S.S.R. to sit down with us to share ideas on practical matters with a view to working out mutually advantageous agreements, even though agreements at an early stage might be quite limited in scope.

Such explorations, unilateral and bilateral, must take into account existing agreements bearing on the matter, and there are quite a few of them, some having many states parties.

Two streaks of considerations need to be recognized and developed systematically, particularly in unilateral deliberations: One, considerations in favor of having ASAT systems and in favor of retaining unencumbered freedom to use them; and two, considerations in favor of agreed limitations on ASAT activities and systems for carrying out such functions.

Samples of reasons for having ASAT systems are: desirability of "taking out" satellites which might represent operational assets to an opponent or operational problems to our forces; desirability of being able to respond in kind if any of our space assets were taken out.

Samples of reasons for placing agreed limitations on ASAT activities and systems are: Possession of ASAT systems does not provide protection to our positively directed space assets; use of our ASAT systems can provoke responses in kind to our net disadvantage. Finding a balance of net advantage among such considerations will never be easy, and it might not remain fixed over long periods of time.

In my opinion, key questions to be dealt with in the search for a balance of net advantage are these: A. what is an ASAT system; and B. what is a practical general scope for a possible ASAT agreement; and these two questions are closely linked.

In my opinion, an ASAT system should be considered to be any means for destroying or damaging satellites; means for otherwise influencing the carrying out of missions through systems using satellites as components should not be considered to be ASAT systems. As to agreement scope, it ought to deal with actions to damage or destroy

satellites and means for such actions; it should not deal with actions to otherwise influence the carrying out of missions through systems using satellites as components.

Now, I will illustrate this vital matter with an example. Suppose a satellite carries radio receiving equipment which might facilitate the mission of collecting intelligence information about another country's radio emitters. Actions by the latter country to damage or destroy the satellite should be addressed by the provisions of an ASAT agreement; the right of that country to frustrate the collection mission by turning off military radio emitters, for example, should not be addressed by the provisions of an ASAT agreement.

There will never be, at least not in my lifetime, a general agreement that any and all missions, of whatever kind, can be carried out with a guarantee of no interference in any form so long as a satellite is somehow involved.

There are selective agreements in existence which provide for general noninterference with missions, but they are few and unique; if there are to be more, they will surely be done on a case-by-case basis; an ASAT agreement is not a proper place for dealing with assurances of noninterference with missions carried out using undamaged satellites in mission systems.

An important example of a unique undertaking not to interfere with a defined mission, whether or not satellites are involved, is to be found in several existing arms control agreements between the U.S. and the U.S.S.R., in which the parties agreed not to interfere with verification of compliance using national technical means. The mission is clearly defined, and the noninterference undertaking is general, not limited to refraining from blowing up satellites.

Analogous undertakings, directed at missions rather than satellites or other components, are to be found in the International Telecommunications Convention.

A brief repetition: the scope of any ASAT agreement should be concerned with actions to damage or destroy satellites, and evaluations of desirability as to U.S. interests should be based on a premise of such scope. Questions of other assurances concerning noninterference with missions are separate matters.

Thank you.

[Ambassador Buchheim's supplementary statement follows:]

Arms Control Measures, Current and Potential, Applicable to Satellites and Their Uses

(By Ambassador Robert W. Buchheim)

The remarks in my statement of this date and the text of this paper are my personal expressions only; they have not been reviewed, cleared, or directed by any department or agency of Government. There is nothing in these texts that, in my opinion, is or ought to be classified.

In considering the possible relationships between arms control and space matters, the first general question of interest is this: is there a useful role for arms control agreements as applied to space equipments and activities? The initial part of an orderly answer to this question is that there already is a body of international obligations, to which the United States is party, applicable to space equipments and activities, including but not limited to the following:

The Outer Space Treaty. (1)

The Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Space Objects. (2)

The Space Liability Convention. (3)

The Outer Space Registration Convention. (4)

The Limited Test Ban Treaty. (5)

The International Telecommunications Convention, and related agreements, for example, the INTELSAT Agreement. (6)

Various other agreements concerning communications satellites, the space shuttle, etc. (6)

The "Hot Line" Agreement, (7) and the subsequent "Hot Line" Modernization Agreement. (8)

The "Accident Measures" Agreement. (9)

The ABM Treaty, (10) the Interim Agreement, (11) and other arms control agreements containing provisions as to behavior toward national technical means of verification. (12–14)

Taking note of the existing body of international obligations as to space equipments and activities, a more practical form of the general question posed above is: would it be in the interest of the United States to undertake additional or amended obligations as to space equipments and activities, particularly in the area of anti-satellite systems and activities, and, if so, what kinds of obligations? It is conceivable that this question might be answered usefully in the abstract, but I doubt it. It seems to me that sound progress on this practical question is much more likely to be realized if we proceed in an essentially experimental or exploratory fashion—taking it as a working hypothesis that we might wish to put into place some kind of further agreement or agreements on anti-satellite systems and activities, then trying to explore in detail what kinds of possible agreements we might pursue, what might be involved in implementing each of them, and what they each might offer to the furtherance of U.S. interests. The possibilities, of course, include no new agreement on anti-satellite matters; but in any case, the body of relevant existing agreements is the platform from which we depart in explorations of other tentative agreement possibilities.

In advocating an experimental or exploratory approach I am not referring to any process of trying out different propositions in negotiations; in fact I am not going to deal with negotiating aspects at all today, except to remind you that three negotiating rounds have already been conducted between the United States and the U.S.S.R. on anti-satellite matters. (15–21) The experimental or exploratory process to which I am referring now is a process to be undertaken in our own private councils in which we carry out intellectual experiments as to objectives and questions of implementation. Such experiments will inevitably lead to conclusions that some posited objectives would, if converted into specific agreements, serve U.S. interests well and others would not. Such estimates will, in some cases, flow largely from the objectives themselves and, in other cases, flow largely from the implementation requirements of the agreements implied. I will address some topics as though some such intellectual experiments have already been carried out and brought to definite conclusions. That will save time, and I am sure it will not inhibit discussion in or before this Subcommittee.

An important practical preliminary question is: what is an anti-satellite system? Of my list of practical questions I do put this one first, not because it is a formalistic nuance, but because it is a practical question which is likely to overhang today's subject for the indefinite future and will need to be dealt with over and over again as technological and other circumstances move in unpredicted directions. There is no generally-accepted definition of an anti-satellite system, and it would probably not be desirable to try to create a negotiated definition, at least for the time being. For my purposes now I will assert that an anti-satellite system is any kind of system to destroy a satellite or to damage a satellite (for example, by poking a hole in its skin or by damaging equipment incorporated in the satellite)—in short, any kind of system for doing violence to a satellite. My reason for adopting this view will, I hope, become clear in my discussion of the distinction between actions against a satellite and actions to influence the carrying out of a mission using a system in which a satellite is a component.

Another practical question which we must continuously explore and test is: why would anybody want to develop and/or deploy an anti-satellite system? Some possibilities are the following:

To actually do violence to spaceborne assets, or to be able to do so quickly;

To retaliate in kind if violence is done to one's own spaceborne assets;

To rectify any substantial asymmetry which might arise from possession by one party of an ASAT capability superior to that of another; (22, 23)

To lure another government into a game on space matters on the basis of a view that net advantage could be gained by doing so;

To make a political point that attacks on satellites, or clear preparedness for such attacks, are acceptable forms of behavior except as limited specifically by agreements in force;

A general R&D interest in understanding and advancing proficiency in space technology and operations as a hedge against possible future contingencies;

A non-specific interest in being seen as generally "ahead" in this kind of space capability; (24, 25, 26)

As a cover for some other kind of activity.

Next, there is need for careful exploration of the question: why might we want to put agreed limitations on anti-satellite operations and/or means for such operations? Some possible reasons are the following:

To save money; a dollar spent on an ASAT system is a dollar spent, period; a dollar to be spent on an ASAT system might be, and probably would be, charged to the "military space" part of the budget, tending to compromise allocation of resources to positive military space programs;

Recognition of the fact that a U.S. anti-satellite system will not provide protection to U.S. spaceborne assets, unless it has a very prompt anti-anti-satellite effectiveness against a competing ASAT system and is supported by a decision and control arrangement of adequate agility:

Recognition of the fact that the United States and other countries rely increasingly on spaceborne assets for military, economic scientific and other purposes: (23, 27)

Appeal to the argument that an ASAT-limitation agreement would reinforce other arms control agreements, particularly by adding to assurance of compliance with provisions prohibiting interference with national technical means of verification; this argument, however, would be served only by an ASAT agreement which placed effective limitations on means for carrying out violent operations against satellite components of verification systems; prohibitions on the carrying out of such operations already exist in the arms control agreements contemplated in this argument;

To suppress the likelihood of an "arms race in space", or a "race" in "space weapons"; (28, 29, 30)

To deal confidently with the problem of ambiguity in determining the mission being carried out using a particular sastellite; (31) that is, avoiding problems of attacks on satellites motivated by misunderstanding as to uses of them.

These two streams of considerations will, in my opinion, continue to evolve and change in form as time goes on and circumstances change; and, also in my opinion, we will advance national and international security by keeping timely account of and striving for systematic development of both streams of considerations.

The United States has, clearly and properly, embraced a vigorous approach to our own military space program, with explicit attention to likely evolutionary aspects of the field, including the desirability of finding ways to avoid expansion into space of the existing environments of warfare. (23)

In my opinion, there would be merit in again engaging in well-prepared discussions with the U.S.S.R. for the explicit purpose of seeking mutually-advantageous agreements, however limited in scope in early stages, on anti-satellite operations and systems. In offering this judgment, I emphasize the need for careful preparation; I have already indicated what I mean by this generally in my earlier characterization of an experimental or exploratory process in our own councils. If tangible progress is to be made, we will need, when we are ready, to join with the U.S.S.R. in a continuation of such processes with their views being added for consideration.

Pursuit of the arms control branch of national security actions in the context of anti-satellite matters, must include dealing with such practical, even tedious but important, questions as the following:

There is the question of agreement coverage as concerns the dynamic classes of spaceborne objects to be dealt with. It is convenient short-hand to talk of satellites and antisatellite systems; however, there are interesting objects on trajectories other than orbits around the Earth. Existing agreements—for ex-

ample, the Liability (3) and Registration (4) Conventions—refer to "space objects" to cover things such as interplanetary probes in addition to Earth satellites. There is no evident reason for not contemplating all space objects in explorations of possible new agreements, even though we might refer to them as possible ASAT agreements. A relevant detail: the record associated with the existing agreements (3, 4) makes clear that ballistic missiles are not included in the term "space object."

Next, there is the question of coverage as concerns ownership of, control of, or other aspects of interest in and responsibility for a space object. We would, almost surely, want any new agreements to cover all space objects in which we have an actual interest; but we will also wish to recognize the fact that there are, or might be, space objects which are none of our business unless they become so by virtue of some appropriate action under prevailing international law or some other aspect of national interest. The Registration Convention (4) provides a partial basis for orderly identification of interest in a space object. The formulation of a complete set of criteria or circumstances which will identify a space object as one covered by an ASAT agreement is another matter to be explored. This is especially important for the United States, in view of our extensive involvement with others in joint space activities, including commercial activities.

Next, there is the question of the possible relationship of any new agreement on ASAT matters to the most general of the existing agreements on space activities: The Outer Space Treaty of 1967.(1) In addition to the basic obligation set forth in that Treaty that the parties "shall carry on activities in the exploration and use of outer space . . . in accordance with international law . . .", the most significant provision, from the standpoint of our topic today, is the following portion of Article IX: "If a State Party to the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space . . . would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space . . . it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space . . . would cause potentially harmful interference with activities in the peaceful exploration and use of outer space . . . may request consultation concerning the activity or experiment." This portion of Article IX of the Outer Space Treaty seems to me to be an entirely appropriate basis for serious United States-U.S.S.R. discussions concerning ASAT systems and activities—the potential for "harmful interference" is clear on the face of the matter: that is the eventual purpose of any ASAT system or operation. The products, if any, of such consultations, that is, a new agreement, should, of course, be brought to the attention of parties to the Outer Space Treaty; they might, and probably would, wish to consider a multilateral agreement in further development of an agreement between the two initial "ASAT powers" consistent with the provisions of the Outer Space Treaty.

It surely would not be appropriate for the United States and the U.S.S.R., in a bilateral ASAT agreement, to prescribe terms to be applied to space objects in which neither of them had an interest or with respect to which neither had an acknowledged responsibility; but there is an aspect of third-party circumstances which does require exploration in order to be sure that U.S. interest in joint space programs is dealt with adequately, that is, the commitment in the Outer Space Treaty to carry out space activities in accordance with international law. Most governments share approximately the same body of international law; however, the body of such law shared by any two specific governments is not exactly the same as the body of such law shared by any two other governments. As a relevant example, international law shared by the United States and the U.S.S.R. includes the provisions of bilateral arms control agreements, in particular provisions concerning national technical means of verification; no other governments are party to those agreements and they are not included in the bodies of international law to which any other governments have committed themselves. Concerning the Outer Space Treaty itself, its provisions are included in the bodies of international law embraced by 89 governments, but the Government of the Peoples Republic of China is not one of the 89—a fact which represents, at a minimum, a peculiarity in the field of space activities in which the United States might have interests on the basis of agreements of cooperation.

Another feature of the Outer Space Treaty of significance is the undertaking, in Article IV, ". . . not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction . . .". So far as I know, no practical problem has arisen with respect to this provision or the general language of Article X as to observation rights; however, there is a specific potential problem in the ASAT context which ought to be dealt with in some reasonable way—one might consider it proper to assure compliance with the undertaking in Article IV by bringing a suitably-instrumental satellite along side a suspect satellite to "inspect" it; however, such an operation could seem indistinguishable from a maneuver for incipient attack.

Next, we must explore critically possible approaches to the fact that, beyond specific limitations undertaken in existing agreements—more extensive on the part of the United States and the U.S.S.R. than any other countries—there are no agreed limitations on functions that might be carried out through the use of space objects. A practical ASAT agreement must be crafted in full recognition of this fact, and still promote the interests of the parties; not an easy task. We surely would not wish to turn an ASAT agreement inside out and make it a definitive agreement on what may or may not be done using space objects. The broad choice with which to begin experimentation is between advocacy of: (a) a position that any satellite in which a party has an interest is to be immune from violence no matter what function it might be used to facilitate; or (b) a position that a satellite is a fair target for violence if it is used to facilitate certain kinds of functions which are agreed by the parties to be heinous enough to warrant such violence. Both of these approaches involve some difficult details—which I will leave to your imagination. This little problem leads naturally to a further, and very important, question.

That question is: should an ASAT agreement deal strictly with acts of violence against space objects themselves, or should it deal with systems in which space objects are components? Without elaborating, the equivalent of this question is: should an ASAT agreement provide for limitations on what can be done to a space object, or should it also deal with operations to frustrate missions undertaken with systems in which space objects are components? In my view the first alternative is the practical one. Let me try to coax you in this direction with some examples:

Suppose party A transmits from a satellite signals of a kind that, when received at TV sets inside the territory of party B, will enable the viewing of material which the government of party B deems intolerable, or signals which are not consistent with telecommunications regulations applicable within the territory of party B. (32, 33) Suppose, after trying to persuade party A to stop, party B vents its wrath by destroying or damaging the offending satellite; would that be an ASAT act to be subject to the provisions of an ASAT agreement? I certainly think it would be. Suppose, instead, that party B acted to suppress the viewing by its citizens of the offending program material by forbidding the watching of it, or sending the police to seize or smash everyone's television set, or putting a tax on TV sets so high that none of its citizens could afford one, or by emitting jamming signals so that the offending program material could not be viewed within its territory; would these be ASAT acts to be subject to the provisions of an ASAT agreement? I think not; they might represent human-rights questions, but they should not be dragged into an ASAT agreement.

Suppose party A deploys a satellite containing radio receiving equipment, with the possible purpose of picking up radio signals from military units in the territory of party B and relaying such signals to ground stations for military analysis. Would it be appropriate to deal in an ASAT agreement with party B's possible temptation to destroy or damage the satellite? I think it would. Would it make sense to try to include in an ASAT agreement a limitation on party B's rights to turn off military emitters when he thinks their signals might be received by party A to the disadvantage of party B? I think not. Would it make sense to try to include in an ASAT agreement a limitation on party B's right to turn on additional emitters to influence analysis of his signals? I think not. There is not now, and probably never will be, any meaningful general international agreement in which a government undertakes to guarantee the uninhibited gathering by others of information about all of its military radio emitters. There would be no sense in trying to include in an ASAT agreement any provisions which would have the effect of such an improbable guarantee.

This same line of reasoning applies to the distinction between a satellite and a system exploiting the satellite as a component in order to carry out, for example, the mission of targeting ships or the mission of communicating with overseas forces in combat operations.

Advocacy of an ASAT agreement prohibiting violent acts against satellites, but not dealing with other measures to counter missions using undamaged satellites as system components, would not be a complete policy and should not be viewed as such. This practical fact should not discourage interest in carefully-crafted ASAT agreements. There are already agreements which deal with the countering of certain specified missions, and other agreements of this kind could be brought into being in the future; but this is a separate subject which we ought not try to assimilate in an ASAT agreement.

Current examples of agreements which deal with the countering of missions include the following:

Certain of the bilateral United States-U.S.S.R. arms control agreements (12–16) prohibit interference with national technical means for verification of compliance with the provisions of those agreements. In these agreements the mission is clearly stated and doing anything to interfere with the carrying out of that stated mission is prohibited. The prohibition is not confined to the blowing up of satellites; and the national technical means referred to might or might not be systems including satellites as components.

The Internatonal Telecommunications Convention (6) contains provisions limiting interference with "communications facilities", and the mission of such facilities is described in the Convention; the systems used might or might not include satellites.

It is virtually certain that any agreements having to do with counters to missions and systems for carrying out those missions will continue to be case-by-case developments; no single general agreement, ASAT or otherwise, is likely to be a productive vehicle for this class of subjects.

The distinctive nature of agreements directed to missions is further illustrated by this circumstance: there is not, and probably never will be, an international agreement to prohibit interference with a system used to target ships; however if such a system were used to facilitate a humanitarian rescue operation, it could be argued reasonably that any interference with the system while it is being so used would not be consistent with the provisions of the International Telecommunication Convention.

One can ask this question: suppose an ASAT agreement prohibits the damaging of a space object, and suppose some action of a party inadvertently damages a space object? The elements of a sensible answer are:

Accidents will happen:

Provisions for consultation should be included in any practical agreement to deal with such contingencies; for example, providing for advance notification of a possibility of collision—trajectories of space objects are predictable;

Note should be taken again of the provisions of Article IX of the Outer Space Treaty; if any party is going to launch a space object which will contain items unusually susceptible to "harmful interference" from activities of any other party, Article IX provides a clear basis for going to other parties, describing the potential problem, and seeking cooperation in avoiding or moderating such a problem. Such consultations might not be easy—most international dealings are not easy—but they should be feasible in most instances of civil functions. As to military functions, the choice for or against such an approach might be more gripping; however, we already have one toe in the water and pointed in this direction: Article 3 of the "Measures Agreement" of September 30, 1971, provides that the Parties undertake to notify each other immediately in the event of signs of interference with missile warning systems or with related communication facilities, if such occurrences could create a risk of outbreak of nuclear war between the two countries, and Article 7 provides for consultations.

Put most simply, I suggest the following:

There are reasonable considerations for and against seeking further international agreements as to anti-satellite activities and means to facilitate such activities;

Such agreements, hypothetical at this time, could take a variety of forms, and each recognizable form should be examined by us as to its potential value to the U.S.; one cannot be "for" or "against" an "ASAT agreement" regardless of its

scope and terms; each discernible form should be assigned its pro's and con's; and judgments might change with time and circumstances;

Examination of possible ASAT agreements must take into account relevant existing agreements;

A particularly important factor is the distinction between a "space object"—the unique artifact present in space—and the system which includes such an object as a component. What is generally referred to in U.S. terminology as a "space system" consists at least of ground control and terminal facilities, a launcher replenishment component (vehicles, bases and support arrangements), and the space object component or components. (23)

In my opinion, general agreement as to violence against space objects themselves is a practical objective; but agreement as to measures to influence the carrying out of missions by systems using space objects as components can only proceed on a case-by-case basis.

We can, and in my opinion should, aspire to find desirable agreements, probably in a gradual sequence, on limitations on anti-satellite systems, with due regard for accompanying verification needs.

As to this last point, it seems to me that finding desirable ways to limit by agreement ASAT means and to agree on needed verification measures will be hard and difficult work, but can be manageable if we establish and maintain clarity on the operations of interest in the context of potential ASAT agreements, that is, only operations to destroy or damage the space object components of systems.

As to elimination of ASAT means, or prohibitions on their possession, or quantitative or qualitative limitations on them, the central problem, of course, is that of devising practical, effective and verifiable provisions through which to implement such objectives. This task is rendered particularly difficult by the fact that an ASAT system is quite likely to exploit assets, for example ground-based tracking and communications systems, which support other non-ASAT kinds of activities, and the fact that some non-ASAT kinds of systems, for example ABM systems, are likely to have some degree of ASAT capability. (28, 29)

The ABM Treaty has limited relevance as a model for structure of a possible ASAT agreement; but it is a good example of a general fact that is likely to remain a fact: the two Governments party to that Treaty can agree to limit certain classes of armaments while retaining unquestioned their inherent right of self-defense.

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Senator PRESSLER. Thank you.

Let's return to the question I asked when you made your unanimous-consent request. Why, in your judgment, were the talks that we had going shut off?

Ambassador BUCHHEIM. I cannot address the why in the sense of assessing motives of individuals or groups of individuals, but I can tell you what in fact happened as known to me. I cannot remember the date of the Vienna summit in the summer of 1979—it was 1979, but I do not remember the precise date. As of that time that the summiteers were clearly on the way to Vienna, the two delegations working in antisatellite negotiations had been meeting since some time in April and had clearly come to a point where they both acknowledged, as they had at the end of the preceding two rounds, that about as much progress had been made and as much clarification accomplished as was likely during that round, and that it was appropriate that there be a break, as there had been after the first two rounds, for both parties to study the questions that had surfaced and proposals that had been made in their own private councils.

That was agreed between the two delegations. The two delegations further agreed, obviously with the authority of their respective governments, that when one or the other decided that his own unilateral studies had been carried to the point where resumption of active negotiations together would be profitable, the other party would be notified to that effect through diplomatic channels.

That is where matters stood when the two delegations adjourned by the third round. Now, what in fact happened after that is: Nothing. Nobody deliberately axed the negotiations, nobody scuttled them or whatever executioners like or nautical analogy might be attractive. Just nothing happened; and my own observation is that basically nothing happened because by that time, which got to be the late part of 1979, the administration at that time was seized with more than it could do on a whole variety of subjects. Afghanistan not being the least, contentions over what to do with the SALT II Treaty being obviously significant, changes of personnel, et cetera, et cetera, et cetera.

Now, that is not very spectacular, but that is the objective answer, that just nothing happened.

Senator PRESSLER. In those talks did you find the Soviets treated the negotiations seriously?

Ambassador BUCHHEIM. Very. They fielded an excellent delegation. If you ask me what I mean by excellent delegation, I mean they were clearly competent in their fields, and I could personalize that by saying I would have been honored to be the head of that group of men as a delegation.

Senator PRESSLER. Because they knew their subject and they knew where they were coming from.

Ambassador BUCHHEIM. Excuse me, sir. The basic composition of that delegation was the head and the deputy head, who were figures from the Ministry of Foreign Affairs that had appeared in many manifestations over the years in the U.N. and elsewhere and were well known to people who travel in those circles on the U.S. side.

The remainder were people just appearing out of nowhere, and they were the ones who clearly held in their heads and hands the specific information about Soviet space interests.

Senator PRESSLER. I do not understand. Do you mean they replaced the first team?

Ambassador BUCHHEIM. No. The team was made up of these two groups, the two top people who were foreign affairs diplomatic people, who were well known to U.S. personalities, no mysteries about those guys. The body of the delegation, the second part, were people who had never appeared anywhere before.

Senator PRESSLER. I see.

Ambassador BUCHHEIM. And were clearly well qualified in the field we were dealing in.

Senator PRESSLER. What I want to know is, did you feel that we had gone forward? Were the Soviets interested in entering into an agreement? I keep hearing from this administration and the past administration that the Soviets would be hard to negotiate with, that they are not particularly interested in this area. Of course, on the other hand, we do not want to enter into a treaty that threatens our national security. I'm not one who totally trusts the Russians.

But it seems that they have taken more initiatives in this area than we have. It seems that the Soviets are more willing, on the face of it, to move toward a treaty or an agreement; would you agree with that assessment?

Ambassador BUCHHEIM. Not quite, Mr. Chairman. The fact is that talks on antisatellite matters were initiated at the request of the U.S. Government. We were the one who exposed that notion to them, and it took them quite a while, during which they asked questions in many ways of many people in the U.S. Government about what our interests were, what our ideas were, until they agreed to start talks.

They did agree to start them and they obviously took them very seriously. Now, the point that you make, that they have been more active than we have, at least in a public way, is true as of relatively recent times. So, I guess if I had to generalize I would say that at the outset we were the ones who were espousing the idea of doing something about this area, then comes the last half of 1979 activity in the U.S. Government basically just stopped, and since that time the

Soviet Union has made proposals that you described when Professor Rostow was up here, to suggest that they are trying to move this thing along.

And of course, there have been expressions of interests, strong expressions of interests on the part of other governments in the CD and elsewhere, and I am sure that much of that tendency to express interest in further arms control progress related to space activities by other governments is motivated in part by the fact that they remember that the ASAT talks happened. Something serious seemed to be going on, with the result that on the generally recognized international agenda of subjects that seemed, for one reason or another, to warrant attention, negotiations on the antisatellite matters are on that agenda, just like comprehensive test ban ideas have been on the agenda for decades, and some stronger controls on chemical weapons are on the agenda.

By virtue of our getting into those talks with the Soviets, I am satisfied that we in effect put that subject on the international agenda and it is going to be there forever.

Senator PRESSLER. We will hear the opening statements of the other two witnesses, and please remain here. Yet, the message I receive when raising this subject—I got it this morning from the Pentagon and from Dr. Rostow—is that space arms controls is not that important. We can keep it on the back burner, we do not need to take initiatives in that area, we are really not going to spend that much in that area, and just do not worry about it over in Congress, and do not worry, nothing dangerous is going to occur.

That is the impression I got from the Pentagon and Dr. Rostow. But I will have each of you comment on that later.

Dr. Garwin, would you like to proceed?

STATEMENT OF RICHARD GARWIN, PH. D., IBM FELLOW AT THE T. J. WATSON CENTER AND PROFESSOR OF PUBLIC POLICY AT HARVARD UNIVERSITY, CAMBRIDGE, MASS.

Mr. GARWIN. Yes; I am Richard Garwin. I am speaking for myself alone at the invitation of the committee, but from a background of 32 years of involvement in defense and intelligence matters as a consultant to the U.S. Government.

I agree 100 percent with Ambassador Buchheim's presentation, and 90 to 95 percent of the statement by Drs. Rostow and DeLauer, but I think my differences from them are significant.

In global summary I agree that we are at an important juncture as to whether space will be used for war or whether war on Earth will start in space, but the evidence is not in the magnitude of the budget nor in the plans, formal plans, but in the urgings and expectations of individuals or groups.

First, I personally support the military use of space for military support activities. My involvement began in 1958 when I was a member of the U.S. delegation to the Surprise Attack Conference in Geneva, and I helped to devise communications satellites specialized for the enforcement of any possible treaty, deployment verification, prevention of surprise attack, and so on.

All of these activities would be dubbed military space, and they do not involve the deployment of arms in space, the attack on weapons or anything like that. So that's why I say that it's not the overall military space budget which has anything to do with the arms race in space.

Now there are great civilian benefits from space, from communications satellites, weather satellites, navigation satellites such as Transit which has been operational probably for 20 years, some land observation satellites, and the conduct of important scientific investigations in space.

We have mature military satellites, Comsat satellites, reconnaissance satellites for treaty verification and for intelligence gathering, and the Soviet Union, of course, has a full complex of these as well, including some which we do not appear to have, for instance, the radar ocean reconnaissance series, one of which fell in Canada some years ago.

In the future, military or so-called military satellites will include the Navstar global positioning system with its 30-foot accuracy in three dimensions anywhere in the world, which will contribute to our capability to bomb, the ability to launch missiles with high accuracy, but at the same time to low-cost navigation of ships, aircraft, and even perhaps to the cooperative surveillance of aircraft for air traffic control.

That system, as has been announced by the administration, will carry the integrated operational nuclear detection system which will help in fighting nuclear wars by determining the location of both our nuclear weapon explosions and those of any other country. That will provide a feedback which will allow fewer nuclear weapons to exert the same amount of damage.

In the future we will have durable decoyed duplicate communications satellites for survivable command and control communications, and Dr. DeLauer mentioned the Milstar system which will be the primary high performance military communications satellite system for all purposes in the future.

I feel in general that space should be used economically both for civilian and for military purposes. If it is better and cheaper to do something via space, then that's how it ought to be done. And parenthetically, the Shuttle is not in this line of economic use. It costs more in the early years and will probably cost more, as far as I can see, for a long time than expendable boosters. But it is a national decision, and we'll be using the Shuttle to the degree that it can be used in competition with foreign-provided expendable launch.

Now, what are the threats in space? Well, going back to ancient history, in the 1960's the United States had operational an antisatellite system which figured in the annual reports of Secretary of Defense MacNamara. We had two systems in fact, one of which was based on Johnson Island and I believe was some Jupiter missiles with nuclear warheads.

Any minimal ABM system can be used as an antisatellite system. and we have considered at times using what remains of the safeguard system for ABM purposes.

The Soviet Union for many years has tested. with not very good reliability indicated in the press, an orbital interceptor mounted on a large ICBM-like missile which goes into orbit and attacks thus far only Soviet test satellites. But presumably that system, believed by

many to be operational, will not in its actual operation destroy Soviet satellites.

For the future one can imagine ground-based lasers for damaging satellites, space-based lasers, space mines which can be placed in orbit next to particularly valuable satellites and detonated by remote control. The space mines would follow the space battle stations around, just as Soviet intelligence-gathering ships follow our naval task forces.

Once again, many of the U.S. satellites most important for SALT verification in that role have no real utility in the actual conduct of war, so it is not at all clear that they would be high priority targets at the outbreak of war.

I agree with Ambassdor Buchheim that in looking toward policy determination we ought to consider alternative worlds and ask what are the possibilities, what would be the likely results. I for one, in a homely example, would rather drive around in civilian autos and rely on specialized defense forces to keep the enemy away than to have everyone drive all the time in armored tanks, which have less space, less performance, higher costs, require vastly different roads, use more fuel and so on.

And the same thing is true of space. I believe that we can for a long time have satellites which are very fragile, which do their job in the best way possible at the lowest cost without hardening them very much to allow them to participate in a war in space. At least that's what I prefer.

So we have to look ahead and judge the outcome of different courses of action. We have to decide whether we will emphasize our ability to destroy and protect satellites in space, or whether we should emphasize programs which would allow us and other nations and international organizations as well to benefit from space.

I emphasize that space wars are not an alternative to war on Earth. In my view they are a prelude to war on Earth. And some of my friends who suggest that space would be a dandy location for war—because the United States has much better capability and higher technology than the Soviet Union—miss this point, that war in space will not be decoupled from war on Earth.

We cannot have it both ways. We cannot derive the maximum civil and military benefits from space and at the same time deny the Soviet Union the ability to attempt to derive those same benefits, including observing the locations of our ships and so on.

But there are analogous questions on Earth. If someone looks into the window of your house or office and you would prefer that they did not, you are allowed to pull the shades but not to blind him or her. And Ambassador Buchheim indicated that there are ways of hiding your activities, and those are perfectly legal except under certain circumstances where a specific obligation is undertaken not to hide those activities, as in the case of the ABM Treaty and the SALT I limited offensive agreement.

One can also minimize the temptation which would be felt by the Soviet Union to destroy our military space assets which would be supporting even theater nonnuclear war. We can reduce this temptation by providing low-investment, high-expensive theater backups—not more satellites to be launched which would provide capability

worldwide, but short-duration rockets, balloons, aircraft. These ground-based systems would use the same signal format in many cases as the satellite system and would fully and more capable provide the same information or capability in the theater. So there would be no benefit to the Soviet Union for destruction of those satellites. Of course, there is a cost imputed to us for having these backups.

Now, one can have cooperative measures, and I will come to some, most importantly a treaty. There are some other things which can be done. For instance, if one believes that high-energy lasers are a possible threat to the survival of space assets, one could arrange the development of high-energy lasers to be done jointly or at least openly between the Soviet Union and the United States.

To further deter Soviet attacks on our satellites, I believe we should develop—but not test in space—direct-ascent F–15 aircraft-based antisatellite weapons. This is a satellite killer; it is not a killer satellite simply because it does not go into orbit. It goes up and comes down, intercepting its quarry on a direct flight.

To demonstrate the futility of deployment by the Soviet Union of large and costly weapon platforms such as space-based lasers or the like, the United States should explore, but not test in space, space mines—small, cheap, slowly maneuverable satellites carrying small, conventional shotgunlike warheads which can be fired by secure and unjammable command.

These would, of course, if deployed, violate any antisatellite treaty that we would want to negotiate. And we would therefore neither deploy nor test them. But most importantly, we should immediately enter negotiations with the Soviet Union toward an early achievement of a treaty banning the destruction or damaging of satellites or the emplacement of weapons in space.

The Soviet draft treaty of August 1981 banning weapons in space seems a suitable beginning. It bans deployment or tests of any weapon in space. And the response to an imperfect draft is to redraft. I think that we should provide, if not from the Government at least from independent circles, a draft in treaty language so that this process can proceed.

The negotiations should consider the interests of all nations so that the resulting treaty could be thrown open to accession by other states.

I think a problem was indicated by the previous witnesses in the difficulty of arriving at a policy without knowing what the technical future holds, or knowing what the technical future holds, without having defense programs or exploratory programs which are directed by a policy which itself doesn't exist.

The solution to this is to be less directive. Years ago I joined with others, Alton Frye in particular, in urging an institute of the Congress which would, presented with such questions which require answers at a certain time, independently in language which can be of use to the Congress for legislation or treaties provide not a single product but alternative products.

So I leave you with that. We are on the verge of war in space not because of the billions of dollars in investments in communications satellites or navigation satellites or reconnaissance or military support activities; but because the Soviet Union has tested and we have

in the past deployed antisatellite weapons; because we see the prospect for destroying their space assets and worry that they will destroy ours; and because we are not taking sufficiently seriously the prospect of limiting that threat by negotiation and treaty, while at the same time protecting our national security by having deterrence against the violation of a treaty which might be negotiated between the United States and the Soviet Union.

Thank you.

Senator PRESSLER. Thank you very much for that thoughtful statement, and I shall have some questions for you.

First we will hear from Dr. Steinbruner.

STATEMENT OF JOHN STEINBRUNER, PH. D., DIRECTOR OF DEFENSE STUDIES, THE BROOKINGS INSTITUTION

Mr. STEINBRUNER. Thank you, Mr. Chairman.

I am John Steinbruner, director of foreign policy studies at the Brookings Institution. I am testifying at the invitation of the committee on my own behalf and not for the institution.

I would like to begin with a few brief reflections on the history of arms control. I hardly need remind you that the record is disappointing. Over the past 30 years countless proposals designed to embody the aspirations for stable peace have succumbed to the harsh practicalities of immediate politics.

Military programs have usually outrun attempts to impose mutually agreed restraint upon them. The overriding cause of preventing war has come to rest primarily on preparations for fighting it. Constructive statemanship has played a very subordinate role so far.

Given the deep distrust and antagonism that has dominated relations between the Soviet Union and the United States over this period, it is difficult in retrospect to imagine what might have been otherwise.

If we are to be serious about the current issues of arms controls, we must remember this sober history and be instructed by it. That does not mean, however, that we are condemned to repeat it in its entirety. We should certainly aspire to do better, and in the service of that aspiration we should notice those instances in the past when significant opportunities for arms control appear to have been lost.

There was a moment of opportunity in 1959, for example, when Eisenhower and Khruschev met at Camp David. Historical records suggest that both of those gentlemen were personally interested in restraining the large deployments of ballistic missiles that were then just starting.

Neither of them, however, could prevail against the political atmosphere of the time or against the intense commitment of the respective governments to proceed with a technical revolution in destructive power.

In retrospect it would have been better if their personal instincts had had more effect. There is now general recognition that the United States and the Soviet Union both overshot the mark of prudent deployment of strategic weapons. Twenty-three years after Camp David the two governments are engaged in formal negotiations to reduce those deployments by substantial amounts: a tacit admission that current weapons inventories are excessive.

Realistically, however, the prospects are not good for removing institutionally entrenched deployments in a manner mutually judged to be equitable. Opportunity once lost is not easily recaptured.

A second significant opportunity occurred in the 1960's when commitments were made to deploy missiles with multiple warhead payloads. It is not certain that it would have been possible to prevent these deployments by mutual agreement, but certainly it is a serious error that there was no attempt to do so until it was too late.

At the time the technology to multiply U.S. offensive power seemed too compelling to contemplate deliberate restraint. In retrospect it is quite apparent that mutual deployment of multiple warhead systems has significantly reduced our security rather than enhancing it, and it has done so at considerable expense.

The failure to seek restraint at the point of maximum opportunity—that is, before commitments to large-scale deployments had been made—was a collective misjudgment of our actual security interests.

The recognition of these lessons from the past is important because we are highly prone to repeating the type of error they reveal. Our security planning is dominated by the process of weapons procurement. The arguments that drive our major security decisions tend to focus on the immediate effects of particular weapons programs, and this focus is reinforced by the economic interests and inevitably accompany the development and production of these weapons.

This yields an unwisely narrow view of security that is in our Government only weakly disciplined by those responsible for anticipating broader consequences and for pursuing the enduring objectives of peace and survival over the longer term.

As a consequence, we tend to choose short-term technical advantage at the expense of our larger security interests. In my judgment we are now on the verge of making this characteristic error with regard to the military use of space. Quite obviously, space has become a major frontier of strategic capability, and after 2 decades of exploration a large number of programs are now under way to exploit its advantages in very sophisticated ways.

Over the coming decade equipment will be placed in space and will provide substantially improved intelligence, warning, navigation, and communication capabilities. We will increasingly depend upon this equipment for vital security purposes, exercising coherent, politically authorized command over our military forces, for example, coordinating with our allies and conducting diplomacy with potential or actual enemies.

These impending developments are all to the good as far as they go, but the good is severely jeopardized by a few unfortunate facts. First, all assets in space are inherently vulnerable to deliberate attack. Second, the explicit rationale under which we are deploying some of our most important space systems is quite provocative to the Soviet Union and invites attack on those systems. Third, at the moment there appears to be no serious attempt to foreclose the competition in destruction of space systems, but surely looms in the longer run if it is not immediately prevented.

Our current defense planners understand that the United States is ahead of the Soviet Union in developing the esoteric materials in microelectronic circuitry that form the core of space technology, and they

are eager to secure immediate advantages. They plan to pursue these advantages while announcing their intention to prepare for an enduring nuclear war against the Soviet Union. They apparently discount the Soviet reaction, but the rest of us certainly should not. If we proceed in the course recently set, we are likely to stimulate a major Soviet effort to prepare for attacking our assets in space. A prudent diagnosis for such a Soviet effort is that it will eventually nullify most of our preparations for managing and enduring nuclear war, and in addition would probably render enormously, perhaps prohibitively expensive basic capabilities we require for handling crisis and assuring a coherent deterrent capability.

For these reasons I believe it is urgent that we begin to develop as a supplement to our existing security policies arms control measures designed to regulate the military use of space. As an obvious first step we should seek to prevent destructive antisatellite capabilities from being developed beyond the point they have already reached. Fortunately, these capabilities are still quite limited, but they will not long remain so under current conditions.

We should also investigate the possibility of regulating experimentation in space with directed energy weapons. There is a great deal of excited speculation at the moment about the promise and menace of such weapons, despite the fact that most sober technical assessments are extremely skeptical about their practicality.

Formal regulation might help control irresponsible speculation and contribute more broadly to a regime of regulation that we will ultimately have to develop.

Beyond these provisions the topic becomes rapidly more difficult, and we will undoubtedly need much more reflection and analysis before we are fully prepared to deal with it. There are some military uses of space that have stabilizing effects on international security conditons, and these need to be protected. Intelligence-gathering satellites are an obvious example.

At the moment the international regime under which satellite programs are conducted rests precariously on the two SALT Treaties. It is unwise to allow such an important matter to remain indefinitely hostage to the political controversy that surrounds those treaties.

The use of space for weapons deployments appears in general to be a threatening possibility and it is likely that further reflection will lead to measures supplementing the existing treaty against weapons of mass destruction in space. At this point it is most urgent that we simply recognize a serious gap in our existing policy and realize that if the current opportunity is lost, we might well condemn ourselves to decades of virulent, destructive competition.

Senator PRESSLER. Thank you very much. Dr. Garwin, you are with the IBM Center, is that right, or are you with Harvard, or with both?

Mr. GARWIN. Both, but principally the IBM Research Center. However, I am speaking for myself.

Senator PRESSLER. Certainly. IBM has a great interest in the area of communications. While I know you are speaking for yourself, what is the view of private business, of the companies that put up these expensive satellites or that are going to, what is their view of this killer satellite arms race? Have you heard how they view this situation?

Mr. GARWIN. Like anybody else in the world who tries to do business or live a life, they do not want war, and they certainly do not want the communications satellites or the broadcasting satellites or the navigation satellites interfered with or destroyed. I have no doubt that anybody involved in the peaceful exploitation of space has those views.

Senator PRESSLER. Would each of you respond. I have two theories. One is that we are in the very beginnings of a very expensive arms race in outer space. And two, I am of the opinion that we have been very slow at starting to try to negotiate an agreement. And Mr. Rostow seemed to disagree with me on both those points, and I found it hard to pin the administration down.

But as for my first theory, are we in a major arms race in outer space? I think you have answered that in part of your testimonies, but would you speak directly to this point.

Mr. GARWIN. I believe we are at the beginning of a major arms race. It is not that the Pentagon wants it that way or plans it that way, but the administration—and the Congress, I must say—do not have the courage or the competence to resist the technological fantasies which are pushed by many in the public and in the Congress itself.

And so, when the Pentagon comes in with a measured response, a study of space-based laser prospects, they are chastised by important Members of the Congress for not having done their job, not being sufficiently aggressive, and not spending enough money to protect the national security.

In a political system like ours, one can fight such actions only so long, and then the better part of valor is to spend the money, even if it is regarded as useless, simply because there are supporters out there who demand it.

Now, I remind you in 1974 of an excess of candor by that great Secretary of Defense, James Schlessinger, who came in and asked for $5 billion more and explained in his candor that he did not really need it, he would not be there asking for $5 billion for the defense budget if there were not a need for that amount of fiscal stimulus to the economy, and the Defense Department was the only organization which had that kind of contingency planning, essentially by edict of OMB. The others are not allowed to have it.

So, defense spending is not entirely oriented toward national security. I think the Pentagon wishes it were, and many of the rest of us wish it were, but many seem to believe that jobs for our districts or—if one could be pardoned for mentioning—reelection prospects are as important in the short term as national security.

So that is why I believe we are at the beginning of an arms race, and the Soviet Union cannot stand idle when they see the arguments here, nor we when we see some publicity from them. But I should turn this over to my colleague.

Mr. STEINBRUNER. As my statement makes clear, I think you are right, as we certainly are in the early stages of what could be a very destructive arms race in space.

The only point I would add is that I think it is still possible to prevent it, and this is the time to do so. I think that certainly, you are very much on the right track in raising concern about this and stimulating the Government to do something. I think it is very clear that

without such stimulus, the Government is unlikely to do something. I would agree that they are being extremely sluggish in developing an approach to arms control.

Ambassador BUCHHEIM. Mr. Chairman, I have a slightly different view of the question of whether we are in an arms race or whether we are in the early stages of an arms race or we are not in an arms race; and I would simply respect everything that has been said by all the witnesses and yourself on that score.

My own view is to basically share your evident sense of impatience with getting on with practical matters that would redirect what both we and the U.S.S.R. are doing with respect to this problem, so that we can, with reasonable confidence, say that with the measures that we have taken or are trying to take through negotiations, we are going to create a situation such that we do not have to wait for—pick a time—15 years from now for historians of that day to tell us in a definitive day that yes, you fellows were in an arms race, or, in 1982 you were in the early stages of an arms race, or no, you were not in an arms race.

I am not interested in letting the matter ride that way. I think we should take prudent measures to, in effect, set that question aside.

Now, this gives me an opportunity to justify again, at the risk of being tedious, my emphasis in my short statement on defining at an early stage, perhaps today, what a practical scope for a useful ASAT agreement might be. In my opinion, a practical scope for such an agreement would be a prohibition on acts to destroy and to damage satellites in which either party has a legitimate interest or responsibility, and to move, with whatever dispatch wit and will allow us, to bring into being practical limits on the systems that would facilitate the carrying out of the acts of damage or destruction.

I am particularly impressed with the need to define the scope of a practical agreement in some such way, so that progress at a reasonably early time is, in fact, practical.

If one gets into all of the possible ramifications such as should we require that an ASAT agreement include some kind of undertakings as to whether or not the parties will or will not take other means, means other than destroying the satellite involved, take measures that will prevent the other guy from finding naval vessels, for example, to the disadvantage of the other, I think the answer is no; that is a different subject.

Or, should we undertake in negotiating an ASAT agreement, to amplify and elaborate the provisions of the International Telecommunications Convention to provide tighter controls on what you can do in interfering with communications facilities, other than damaging or destroying satellites. The answer again is no, that is a different subject. It should be dealt with in the context of amendments to the ITC if we want to do that.

Should the agreement deal with further measures to elaborate the undertakings in the existing strategic arms control agreements or future agreements with the Soviet Union to strengthen, elaborate or otherwise extend the scope of the noninterference provisions concerning national technical means? I think the answer is no, those should be dealt with in those arenas.

Bring the scope of an early kind of antisatellite agreement down to some point where the human mind can grasp it, and more particularly, so that the preparations within the two governments, which clearly you become impatient with, are not conducted in an unstructured way so that every time a consensus is reached on one detail of the problem, somebody raises another detail of the problem. There are a lot of details of the problem that can be brought to fore unless the desired scope with, sufficient generality, politically and practically and otherwise, in a negotiating context, that scope is brought down to something manageable; then we can make progress, take bites on these problems.

An example which I mentioned in my longer statement as something which will have to be dealt with, does not have to be dealt with in an ASAT ngotiation between ourselves and the Soviets, but does have to be attended to, and that goes to your reference earlier to the status of international law in this area: There is a broad and important piece of international law in the form of the Outer Space Treaty of 1967, which must be accounted for. That treaty has some 80-odd parties. Now, I forget the exact number, but there is one strong peculiarity about that particular chunk of international law, and that is that there is one important space power that is not a party to it; and that is the People's Republic of China.

Now, that seems to me outrageous; and it goes to our interest because we want an agreement that will provide some measure, practical measure of immunity from attack, damaging or destroying attack, to satellites in which we have a legitimate interest and bear some legitimate responsibility. That includes satellites that are ours and ours alone that we own, operate, and control. It also includes satellites which are involved in agreements of cooperation between ourselves and third governments. That is one of the third governments, but that government is an anomaly in terms of the body of international law shared by that government and all the other governments of the world that are important in space.

So I think, again, in the interest of arguing for trying to keep the scope of what must be done between ourselves and the Soviet Union down to something manageable, we have to hedge it about, I think, in the short term at least to provisions that we will undertake not to damage or destroy satellites in which either of us has an interest or responsibility.

Leave out of it things that are none of our business; and also, take care of other problems which have a bearing on the matter, such as the nonadherence to the Outer Space Treaty on the part of the Government of the People's Republic of China in our relations with that government.

Senator PRESSLER. Thank you, that was a very good statement, and the PRC certainly should be included.

I would like to ask the two scholars here from Brookings and IBM what is going on in the academic community, and in your immediate groups, regarding writing and research on antisatellite weapons and on outer space arms control issues. Is sufficient attention being paid? That is the first part of my question. The second part of the question concerns the issue of verification. I contend that if we let the anti-

satellite race go forward, we will be reaching a point of no return beyond which agreements could be impossible to verify. I think we could have verification now, but if we let this race go forward much more, some will argue that there is no way to verify a space weapons agreement. Some people are already saying that.

But the further down the road we go, the harder it is going to be to verify a space accord. And in 10 years, it may be impossible to verify any agreement. The arms race in outer space is today in its infancy compared with what I think it is going to be. It is certainly not in its infancy in terms of cost because it is very costly, and we are already well down the road, in my view.

So, let me repeat my two questions. One, what is going on in your academic groups, IBM, Brookings, Harvard, in this area; and two, what is the opinion of scholars on verification? Is it possible now, and if we do not get an agreement now, will it be absolutely impossible in a few years?

Mr. STEINBRUNER. There is a consortium of research institutions that frequently sometimes meet together to discuss current topics of arms control. They did meet over the summer. The members of the consortium are Harvard, MIT, Cornell, Stanford, UCLA, Rand and Brookings. And there were meetings this summer, which I think did identify this topic generally as a matter of significant concern. And presumably, the purpose of those meetings is to try to direct or stimulate, if you will, the response of the academic research community to these topics.

I might add that it is difficult to sustain this research independent of the Government these days, there is not much financial support for it. So the fact that we recognize it as a serious problem does not mean that there will be rapid progress, but nonetheless, there has come to be general recognition that this is a very significant issue.

Just briefly on the second part of your question, I think you are exactly right, and that was part of what I was trying to say. The opportunity is right now to prevent things that will be very difficult to regulate if they occur later in the decade. And there is an element of ambiguity and risk in that, in that we do not have well-defined programs to know what our problems are. We are trying to prevent those problems from ever coming about in the first place, so arranging it so that historians in the future do not have to look back and say that we blew yet another opportunity.

I think that you are correctly characterizing the situation when you see it that way, and I would encourage you to continue to do so. It obviously is very difficult to make this country look that far out in front of its immediate affairs and understand the longer range interest that it has. But one cannot help but try.

You will get some help from the academic community, but I would not certainly rest on that alone.

Mr. GARWIN. I think Dr. Steinbruner has explained what is going on in the normal academic community. At IBM, I have to confess it is just I alone.

I published a paper in the Bulletin of the Atomic Scientists in May 1981 titled "Weapons in Space" where I gave most of these same views.

Verification is always somewhat of a problem but not so much, in

my opinion, as has been imagined. The techniques of verification which are suitable for counting the numbers of fixed, large ICBM's are not really those that would be used for verifying that a country is, in fact, fulfilling its undertaking in regard to a ban on ASAT activity.

The kind of verification that would be required is perhaps an on-challenge explanation of the utility or some features of things that have been launched into space; unilateral capability in some cases for inspecting, because it is very difficult to hide through thick shielding, and so on, the interior of space objects.

So, if one were very much interested in protecting our own space resources, we could, in good time, develop a capability for inspecting what has been deployed in orbit by others. Or we could not. That is an option, and we would decide for ourselves as to whether it was worth the cost.

Since some of these bans would apply to ground-based capabilities for damaging or destroying space objects, it would be the usual verification procedure; not a ban on the capability per se or the development of it, but the deployment or the test. And no one would want to have a new system, on which the survival of the Nation depended, widely deployed without having tested it.

So I think one can put together—and here I second Ambassador Buchheim's approach—an early agreement. The early agreement should have the least amount of verification necessary in order to have the early agreement.

The undertaking, though, should be firm, and the verification capabilities, if not limited by what is written into the treaty, will expand as each side finds it in its interest to have more ability to verify.

Senator PRESSLER. Thank you very much. I am going to probably bring this hearing to a conclusion, but first, there is one more question I would like to submit that any one of you may attempt to answer. Some analysts claim the potential advantages in the U.S. military space program provide us with significant leverage which could be used: first, to turn back the Soviet Union's operational ASAT; second, to make progress in cooperative verification measures: and third, as a bargaining advantage in other negotiations such as START where the Soviets may hold a stronger bargaining position.

Would you comment on these three propositions?

Mr. GARWIN. I have looked at what is required to defend satellites against interceptors and I think that the advantages are with the side that wants to destroy satellites.

Senator PRESSLER. They are on the side of the person who wants to destroy them.

Mr. GARWIN. Yes. So, when you express your willingness to fight a war in space, and by attacking Soviet assets in space gain leverage in some other theater, you have to confess that your own space assets are going to be destroyed as well.

You may end up winning the war, but there will be very little left in space to fight for. Winning would have to be defined as when we send up an interceptor they cannot destroy it as easily as we can destroy theirs. But all of the productive satellites, military or civilian, are much more readily destroyed than these single-day lifetime anti-satellite weapons.

So I disagree totally that we would have an exploitable advantage in the actual use of weapons in space. We do have a very great advantage which I want to preserve in the use of space to support military activities, just as we have an advantage at present in the civilian exploitation of space.

Mr. STEINBRUNER. Let me just supplement that remark by noting that if we attempt to develop our military purposes in space unilaterally in a way that is provocative to the Soviet Union with no regulation of arms control to protect that development, we are going to make it incredibly expensive to do so.

The offense, attacking satellite systems, has tremendous advantages, and the defense can be driven into enormous expenditures in trying to protect itself, and that is a very practical reason for having arms control as a supplement to our existing policy, simply to save money to be able to preserve the uses of space we believe we need.

Ambassador BUCHHEIM. I would just add a few words. You mentioned three points; the first one I frankly did not understand. The second two had to do with some relationship to START.

Senator PRESSLER. First, to turn back the Soviet Union's operational ASAT, using our F–15-based ASAT as leverage against the Soviet system in negotiations. That is what the first point attempted to say.

Ambassador BUCHHEIM. Well, I do not know, I will try to answer that. It is obviously, in large part, a matter of judgment; but whereas one often hears that we cannot negotiate with the Soviets if they have a body of assets and we do not have any assets quite like that, therefore, the thing cannot be done—quite the contrary to that general argument, the fact is that, when we went into the negotiations on antisatellite matters with them in 1978, they had a system that had been tested many times over many years and we did not even have a program well started. That did not seem to bother them a bit; they were still interested in talking about what might be done to control these kind of capabilities.

I think the reason for that is very clear: They respect our technological and industrial capability and determination to do what is in our interest, and, therefore, in looking at something like space activities in which one has to take a fairly long view, the fact they have something and we have not quite yet got something comparable to it is not a big deal. If this country decides to do it, it will do it; and in the case of the F–15-based system we are doing it, and they believe that. They believe it probably more strongly than we do.

Your second two questions had to do with relationships to START, either directly or by way of some bargaining chip concept. I think those are both distinctly bad ideas.

As Professor Rostow suggested, the START people have got a full plate. I think they should be allowed to work on their agenda and get it moving to some conclusion as fast as possible.

Then, echoing your point that you have made many times, we should get on with some kind of controls on antisatellite systems, and the best way to slow down progress on that is to throw it into the pot with all the other problems that the START people have got to deal with. It is quite different. There is no real relationship between

the two that is important operationally as a negotiating pair of topics.

I think that extends to the bargaining chip approach, too. I do not happen to believe in the bargaining chip approach. Two reasons. One is I think the Soviets see that we will not allow a unilateral advantage on their part to get out of hand. We just will not do it. Second, if we lay on a program that is not in our national security interest, just to create a bargaining chip, they are sufficiently bad to just let us go ahead. They will say, by indirection, if you are going to put on some outlandish program which is clearly not defensible in your own interest, do it; enjoy.

Senator PRESSLER. Do you have anything to add?

Mr. STEINBRUNER. Simply that from my look at the historical record generally, I would say that the Ambassador is right about bargaining chips. They really have played very little role, mostly disruptive ones, in the actual negotiations. They sense that they are a threat; the other side tends to respond in kind, and there is a lot of discounting for the reasons he suggested.

Senator PRESSLER. I thank you very much, and I thank all of our witnesses this morning. I will bring this to a conclusion, and declare this meeting of this subcommittee closed.

[Whereupon, at 12:43 p.m., the subcommittee adjourned, subject to call of the Chair.]

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